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THE NEW INTERNATIONAL ENCYCLOPÆDIA

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VOLUME XVII

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KEY TO PRONUNCIATION.

ā as in ale, fate. Also see ĕ, below.
ȧ " " senate, chaotic. Also see ĕ, below.
â " " glare, care.
ă " " am, at.
ä " " arm, father.
ȧ " " ant, and final *a* in America, armada, etc. In rapid speech this vowel readily becomes more or less obscured and like the neutral vowel or a short u (ŭ).
a " " final, regal, where it is of a neutral or obscure quality.
a̤ " " all, fall.
ē " " eve.
ė̄ " " elate, evade.
ĕ " " end, pet. The characters *ĕ*, *ä*, and *ȧ* are used for *ä* in German, as in Gärtner, Gräfe, Hähnel, to the values of which they are the nearest English vowel sounds. The sound of Swedish *ä* is also indicated by *ĕ*.
ẽ " " fern, her, and as *i* in sir. Also for *ō*, *oe*, in German, as in Göthe, Goethe, Ortel, Oertel, and for *eu* and *oeu* in French, as in Neufchâtel, Crèvecœur; to which it is the nearest English vowel sound.
e " " agency, judgment, where it is of a neutral or obscure quality.
ī " " ice, quiet.
i̇ " " quiescent.
ĭ " " ill, fit.
ō " " old, sober.
ȯ " " obey, sobriety.
ô " " orb, nor.
ŏ " " odd, forest, not.
o " " atom, carol, where it has a neutral or obscure quality.
oi " " oil, boil, and for *eu* in German, as in Feuerbach.
o͞o " " food, fool, and as *u* in rude, rule.
ou " " house, mouse.
ū " " use, mule.
ū̇ " " unite.
ŭ " " cut, but.
ṳ " " full, put, or as *oo* in foot, book. Also for *ü* in German, as in München, Müller, and *u* in French, as in Buchez, Budé; to which it is the nearest English vowel sound.
û " " urn, burn.
y " " yet, yield.
B " " the Spanish Habana, Cordoba, where it is like a *v* made with the lips alone, instead of with the teeth and lips.
ch " " chair, cheese.
D as in the Spanish Almodovar, pulgada, where it is nearly like *th* in English then, this.
g " " go, get.
G " " the German Landtag, and *ch* in Feuerbach, buch; where it is a guttural sound made with the back part of the tongue raised toward the soft palate, as in the sound made in clearing the throat.
H as *j* in the Spanish Jijona, *g* in the Spanish gila; where it is a fricative somewhat resembling the sound of *h* in English hue or *y* in yet, but stronger.
hw " *wh* in which.
K " *ch* in the German ich, Albrecht, and *g* in the German Arensberg, Mecklenburg; where it is a fricative sound made between the tongue and the hard palate toward which the tongue is raised. It resembles the sound of *h* in hue, or *y* in yet; or the sound made by beginning to pronounce a *k*, but not completing the stoppage of the breath. The character K is also used to indicate the rough aspirates or fricatives of some of the Oriental languages, as of kh in the word Khan.
n̤ as in sinker, longer.
n̤g " " sing, long.
N " " the French bon, Bourbon, and *m* in the French Etampes; where it is equivalent to a nasalizing of the preceding vowel. This effect is approximately produced by attempting to pronounce 'onion' without touching the tip of the tongue to the roof of the mouth. The corresponding nasal of Portuguese is also indicated by N, as in the case of São Antão.
sh " " shine, shut.
th " " thrust, thin.
TH " " then, this.
zh as *z* in azure, and *s* in pleasure.

An apostrophe ['] is sometimes used to denote a glide or neutral connecting vowel, as in tā'b'l (table), kăz''m (chasm).

Otherwise than as noted above, the letters used in the respellings for pronunciation are to receive their ordinary English sounds.

When the pronunciation is sufficiently shown by indicating the accented syllables, this is done without respelling: as in the case of very common English words, and words which are so spelled as to insure their correct pronunciation if they are correctly accented. See the article on PRONUNCIATION.

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A PARTIAL LIST OF THE LEADING ARTICLES IN VOLUME XVII.

RELIGION, COMPARATIVE.
Dr. Louis H. Gray.

REMBRANDT.
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RENAISSANCE.
Professor Ephraim Emerton.

RENAISSANCE ART.
Professor Arthur L. Frothingham and Professor A. D. F. Hamlin.

REPRODUCTION.
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RESURRECTION.
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REVELATION OF ST. JOHN.
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RITUALISM.
Dr. Reginald H. Starr.

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ROAD.
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RUSSIAN LANGUAGE.
Mr. Judah Achilles Joffe.

RUSSIAN LITERATURE.
Mr. Judah Achilles Joffe.

SABBATH.
Professor Morris Jastrow.

SACRIFICE.
Professor James Morton Paton, Professor Edward W. Hopkins, and Professor Maurice Bloomfield.

SAILINGS.
Lieutenant-Commander Lewis Sayre Van Duzer.

SAINT LOUIS.
Mr. William Vincent Byars.

SAINT PAUL.
Mr. W. A. Schaper.

SALMON.
Dr. David Starr Jordan.

SAN FRANCISCO.
Mr. J. P. Young.

SANSKRIT LANGUAGE.
Professor Maurice Bloomfield.

SANSKRIT LITERATURE.
Professor Maurice Bloomfield.

SAVONAROLA.
Mr. R. M. Johnston.

SCHILLER.
Dr. Benjamin Willis Wells.

SCHOLASTICISM.
Professor Francis P. Siegfried.

SCHOOLS.
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Professor Hubert Lyman Clark.

SEMITES.
Professor Nathaniel Schmidt.

SEMITIC LANGUAGES.
Professor Morris Jastrow.

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THE NEW INTERNATIONAL ENCYCLOPÆDIA

REIFFERSCHEID, rī′fĕr-shīt, AUGUST (1835-87). A German archæologist and classical philologist, born and educated in Bonn. He received a traveling fellowship in archæology from the University of Bonn; spent 1861-66 mostly in Italy, being part of the time charged by the Vienna Academy to make archival research for the *Corpus Scriptorum Ecclesiasticorum Latinorum;* and was professor at Breslau (1868-85), and from 1885 at Strassburg. His works include *Suetoni præter Cæsarum Libros Reliquiæ* (1860), the standard edition of these fragments; *Bibliotheca Patrum Latinorum Italica* (1865-72); *Arnobius* (1875); an edition of Anna Comnena's *Alexias* (1878); and a partial edition of Tertullian (edited by Wissowa, 1890).

REIGATE, rī′get. A municipal borough and market town in Surrey, England, at the base of the North Downs, 23 miles south of London (Map: England, F 5). The town was incorporated in 1863; it owns a sewage farm, provides isolation for infectious diseases, and contributes to technical instruction. From early times it was considered a place of strength; and after the Conquest it was granted to the earls of Warrenne. The parish church is in various styles of architecture, the oldest portions dating from the twelfth century. Trade is chiefly agricultural. Nearby are quarries of freestone and hearthstone and supplies of fuller's earth, and of silver sand for manufacturing glass. Population, in 1891, 22,646; in 1901, 25,993.

REIGHARD, JACOB ELLSWORTH (1861—). An American zoölogist, born at Laporte, Ind. He graduated at the University of Michigan in 1882, studied at Harvard and Freiburg, and after six years as instructor and assistant in zoölogy became in 1892 professor in the University of Michigan. He was in charge of the Michigan Fish Commission in 1890-94, and in 1898 was appointed director of the biological survey of the Great Lakes under the United States Fish Commission. He contributed to many technical journals, and in 1901 published in collaboration with Jennings *The Anatomy of the Cat.*

REIGN OF TERROR. That period of the French Revolution beginning with the fall of the Girondists (q.v.) in June, 1793, and terminating with the overthrow of Robespierre (q.v.), July 27, 1794. See FRENCH REVOLUTION.

REIMARUS, rī-mä′rus, HERMANN SAMUEL (1694-1768). A German naturalistic philosopher. He was born in Hamburg, December 22, 1694, studied at the universities of Jena and Wittenberg, traveled afterwards in Holland and England, and on his return was elected rector at Wismar (1723) and in 1728 professor of Hebrew and mathematics at the Gymnasium of Hamburg. He died there March 1, 1768. He is the author of the so-called *Wolfenbüttelsche Fragmente eines Unbekannten,* first published by Lessing in his *Beiträge zur Geschichte und Litteratur aus den Schätzen der Wolfenbüttelschen Bibliothek* (1774, 1777-78). These *Fragmente,* up to that time known only in manuscript by a few of Reimarus's most intimate friends, produced a sensation throughout Germany, since the author, in the boldest and most trenchant manner, denied the supernatural origin of Christianity. They were partially translated, as *Fragments from Reimarus* (London, 1879). A cognate work is his *Vornehmste Wahrheiten der natürlichen Religion* (1754). His edition of Dio Cassius is one of the most valuable contributions to classical philology (1750). Consult his biography by Strauss (Bonn, 1862; 2d ed. 1877).

REIMS, rēms, *Fr. pron.* rāns. A city of France. See RHEIMS.

REIN, rīn, JOHANNES JUSTUS (1835—). A German geographer, born at Raunheim-on-the-Main, and educated in mathematics and science at the University of Giessen. He made various scientific journeys in Europe, Asia, and America, and was appointed professor of geography at the University of Marburg in 1876, and subsequently at Bonn. His publications include *Japan, nach Reisen und Studien* (1881-86), which was translated into English, under the title, *Japan, Travels and Researches* (1884), as was also his book on Japanese industries (1889); and *Columbus und seine vier Reisen nach Westen* (1892).

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REIN, WILHELM (1847—). A German educator and author, born at Eisenach. He studied at Heidelberg, Leipzig, and Jena, for several years was teacher at Weimar, and from 1876 to 1886 was principal of a school in Eisenach. In 1886 he was appointed professor of pedagogy at the University of Jena. Rein's system of education resembles Herbart's. He ranks among the foremost of educational theorists, and has exerted great influence on the educational institutions of his country. His principal works are *Theorie und Praxis des Volksschulunterrichts* (1879-93) and *Pädagogik im Grundriss* (1892). He edited Niemeyer's *Grundsätze der Erziehung* (1878-79), and founded the educational journal *Pädagogische Studien* in 1880.

REINACH, rī'näk, JOSEPH (1856—). A French publicist, born in Paris. He studied at the Lycée Condorcet and in the faculty of law of the University of Paris, was admitted to the bar in 1877, wrote for the *Dix-neuvième Siècle* and Gambetta's *République Française*, and in 1881-82 was private secretary to Gambetta, then president of the Cabinet council. Having reëntered journalism, in 1886 he became proprietor with Deynarouse of the *République Française*, in which he supported the Union-Republican group. In 1889 he was elected as Liberal-Republican Deputy for Digne (Basses-Alpes), in 1893 was reelected, but in 1898 failed of reëlection because of opposition to his attitude in the Dreyfus case. In the Chamber of Deputies he was a member of the committees on the budget and on the army, and took a prominent part in the legislative debates. He became departmental councilor of Basses-Alpes for the Canton of Moustiers in 1896. He appeared prominently in connection with the Dreyfus case, denounced the introduction of secret documents into the trial of 1894, the forgeries of Paty du Clam and Henry, and the complicity of the latter with Esterhâzy, and was associated with Scheurer-Kestner in the movement for revision. He published on the case several pamphlets, including *La voix de l'île* (1898), *Les enseignements de l'histoire* (1898), *A l'île du diable* (1898), *Vers la justice par la vérité* (1898), *Le crépuscule des traîtres* (1899), and *Les faits nouveaux* (1899), and the volumes *Les blés d'hiver* (1901), *Histoire de l'affaire Dreyfus. Le procès de 1894* (1901), and *Histoire de l'affaire Dreyfus. Esterhâzy* (1903). The brochure *Les enseignements de l'histoire* originally appeared in the *Siècle*, and caused Reinach to be expelled from his captaincy in the territorial army for "a gross offense against discipline" and to be deprived of the decoration of the Legion of Honor. Among his further publications are: *La Servie et le Monténégro* (1876); *Voyage en Orient* (1879); *Le ministère Gambetta* (1884); *Etudes de littérature et d'histoire* (1888-89); and *Les petites Catilinaires* (1888-89), collected articles against Boulanger. He also edited the *Discours et plaidoyers politiques de Gambetta* (11 vols., 1881-85), and *Dépêches, circulaires, décrets, proclamations et discours de Gambetta* (1886).

REINACH, SALOMON (1858—). A French archæologist, brother of the preceding, born at Saint-Germain-en-Laye (Seine-et-Oise). He studied at the Lycée Fontanes and the Ecole Normale Supérieure, was appointed to the French Classical School of Athens (Ecole Française d'Athènes), and made interesting excavation and discoveries at Myrina, near Smyrna, and elsewhere (1880-82). In 1886 he became attaché in the Museum of National Antiquities at St. Germain-en-Laye, in 1890-92 held the chair of assistant professor of national archæology at the Ecole du Louvre, and in 1893 was appointed associate curator of the National Museums. He was elected to the Académie des Inscriptions et Belles-Lettres in 1896. He reviewed works on archæology for the *Revue Critique*, edited a careful text (1877) of Saint Augustine's *De Civitate Dei*, and published among his original volumes a *Chronique d'Orient* (1885-91), cataloguing all discoveries made in Greece to that date; *La nécropole de Myrina* (with Pottier, 1887); *Description raisonnée du musée de Saint-Germain* (1890); *Les Celtes dans les vallées du Pô et du Danube* (1894); *Répertoire de la statuaire grecque et romaine* (1897-98); and *Guide illustré du musée national de Saint-Germain* (1899).

REINAUD, rā'nō', JOSEPH TOUSSAINT (1795-1867). A French Orientalist, born at Lambesc (Bouches-du-Rhône). He was a pupil of Sylvestre de Sacy, became connected with the Royal Library, and was appointed conservator of that institution in 1834. He was also president and (1838 et seq.) De Sacy's successor as professor of Arabic at the Ecole des Langues Orientales Vivantes (1838-67). He published: *Monuments arabes, persans, et turcs du cabinet de M. le duc de Blacas et d'autres cabinets* (1828), a work of great value, especially in the province of epigraphy; a version of Raymond Lully's *Livre de la loi au Sarrazin* (1831, with Michel); *Extraits des historiens arabes relatifs aux guerres des croisades* (1829); *Invasions des Sarrazins en France* (1836); the text and a French version of Abulfeda's geography (with Slane, 1840-48); *Fragments arabes et persans relatifs à l'Inde* (1834); *Relation des voyages faits par les Arabes et les Persans dans l'Inde et Chine* (1845); and *Relations politiques et commerciales de l'empire romain avec l'Asie orientale* (1863). From 1847 to his death he was president of the Société Asiatique.

REINDEER (Icel. *hreinn*, AS. *hrân*, reindeer, from Lapp *reino*, pasturage + *deer*, AS. *dēor*, Goth. *dius*, wild beast, animal, Ger. *Thier*, animal). An Arctic deer (*Rangifer tarandus*) which has long been domesticated and used as a draught animal and a beast of burden in Northern Europe. The wild race still exists in varying abundance almost everywhere from Northern Scandinavia to Eastern Siberia, wandering to the Arctic coast and throughout Spitzbergen, Nova Zembla, and the Phipps and Parry islands. They are not known much south of Lapland in the west, nor below the northern margin of the great forest region in Siberia, but in the Ural region they wander southward to the borders of Perm. Whether the caribou (q.v.) of Greenland and Canada are to be regarded as merely geographical races of the European form, thus considered as a circumpolar species, is a matter of opinion. European zoölogists generally do so regard it, and assert that the differences between European and American examples are not sufficient to be deemed specific. Merriam and other recent American zoölogists think otherwise and set apart no less than six 'species' in the New World. Within historic times reindeer lived in the islands north of Scotland, but became extinct there before the

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twelfth century; they were much more recently numerous throughout Scandinavia. The habits of the American species are outlined under CARIBOU. Those of the plains and islands of subarctic Europe and Asia wander about the tundras and desolate treeless mountains, making periodical migrations from one feeding-ground to another. In early summer the Spitzbergen herds betake themselves to the grassy valleys of the interior, whence they return in the autumn to the coast to feed upon seaweed. The coming of the winter ice cuts off this resource, compelling them to go into the mountains, where they subsist upon the rock-lichens, which they uncover by shoveling away several feet of snow with their flat horns, or pawing it aside with their feet. The alternate thawing and freezing of spring, by forming a hard crust on the snow, interferes sadly with their welfare, and great numbers sometimes starve at this season. In Siberia, as in North America, migrations in scattered herds regularly take place from the barren coast plains southward to the less inclement region along the borders of the forest area, where food may be obtained. Not much is known of the breeding habits of the wild reindeer except that the fawns are born in the spring.

The reindeer has long been domesticated among the Laplanders and the tribes along the coast of Siberia, and used for drawing sledges and as a riding and burden animal, besides furnishing skins for tents, clothing and harness, flesh and milk for food, and horns and hoofs for various utilities. It has remarkable endurance, strength, and speed in drawing sledges, and without this animal much of Lapland and Siberia could not be permanently inhabited. These qualities led the Government of the United States to endeavor to naturalize reindeer among the Eskimos of the north coast of Alaska, who were in danger of starving through the loss of food and uneconomical habits, following the pursuit of excessive whaling and walrus-hunting by white men off that coast. The experiment was conducted under the direction of the Commissioner of Education and the personal care of the Rev. Sheldon Jackson. Agents procured a small herd of Siberian reindeer which, with Lapp attendants, were landed in Northern Alaska in 1889. The training of Alaskan attendants and drivers was begun, and more herds were annually imported. Up to 1898 550 deer had been brought from Siberia, and the stock with its increase amounted to about 5000 in 1903. Several stations were established where the deer were bred, and where Eskimos were trained in their care and use. The history of the attempt is contained in Jackson's *Annual Reports* to the Department of the Interior, from 1890 onward.

The wild reindeer is much larger than the domesticated races. It is as large as the stag, but heavier and more clumsy in appearance. It has a dark coat in summer and a lighter one in winter, with a growth of long whitish hair under the neck, while the region about the short goat-like tail and the outlines of the hoofs are nearly white. It constitutes a genus (Rangifer), differing from that of ordinary deer in the important particular that both sexes have horns, although those of the bucks are larger. These antlers are peculiar in their long, slender, unequally branching beams, and especially in the fact that the brow-tines are greatly produced and palmated, and one is usually aborted to allow the other to push forward into a formidable weapon, overhanging the face.

During Pleistocene time the reindeer was more widely distributed over Europe than it is at the present day, for its fossil remains have been found as far as the Alps and the Pyrenees.

Consult: Lydekker, *Deer of All Lands* (London, 1898); id., *Royal Natural History*, vol. ii. (London, 1896); Nordenskiöld, *Voyage of the Vega* (New York, 1881); Boyd Dawkins, *Cave Life* (London, 1875); and the works of travelers and explorers in the Arctic regions and the countries where reindeer are used. For the American forms, consult: Stone and Cram, *American Animals* (New York 1902); Roosevelt, *The Deer Family* (ib., 1902); Preble, "Biological Investigation of the Hudson Bay Region," in *North American Fauna No. 22* (Department of Agriculture, Washington, 1902); and books cited under DEER.

REINDEER MOSS (*Cladonia rangiferina*). A lichen of great importance to inhabitants of the northernmost regions of the Northern Hemisphere, where it covers great areas and furnishes the chief winter food of the reindeer. It is found in almost all parts of the world, but is most abundant and luxuriant in arctic and sub-arctic regions, often occupying the ground in pine and spruce forests. When such forests are destroyed by fire it soon reappears. It is a variable plant, but always consists of a much-branched, erect, cylindrical, tubular thallus, with small perforations in the axils, and attains a height of two inches or more. Its importance was first brought into notice by Linnæus in his *Flora Lapponica*. It is sometimes used for human food. Its taste is pleasant, although attended with a slight pungency or acridity. It is generally boiled in reindeer milk. Its nutritious qualities depend chiefly on a form of starch, lichenin, which it contains.

REINECKE, rī'nĕk-*e*, KARL (1824—). A German pianist, born at Altona. He studied with his father, Johann Peter Rudolph Reinecke, a musical composer and director. He was Court pianist to Christian VIII. at Copenhagen from 1846 to 1848. He became teacher at the Cologne Conservatory in 1851, and occupied at later times the positions of musical director at Barmen, academic musical director and conductor of the Singakademie at Breslau, conductor of the Gewandhaus Concerts at Leipzig, and teacher at the Conservatory. His compositions are both refined and classic throughout, but possess here and there a marked touch of the romantic. Among his works are: *Serenade, Aus der Jugendzeit, Neues Notenbuch für kleine Leute; Nocturne;* studies, sonatas, quartets, quintets, and trios. The five-act grand opera *König Manfred* was produced in 1867; the operetta *Ein Abenteuer Händels*, in 1874; two three-act comic operas, *Auf hohen Befehl* and *Der Gouverneur von Tours*, in 1886 and 1891 respectively. He also wrote the funeral march for Emperor William I. He became widely known as an excellent conductor, and as a pianist for his interpretations of Mozart.

REINECKE FUCHS. See REYNARD THE FOX.

REINHART, rīn'härt, CHARLES STANLEY (1844-96). An American genre painter and illustrator. He was born in Pittsburg, Pa. From

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1868 to 1870 he studied at the Atelier Suisse, Paris, and at the Royal Academy, Munich, under Streyhüber and Otto. Upon his return to the United States he illustrated for various foreign and American magazines, and frequently exhibited works in oil, water-colors, and black-and-white at the National Academy. From 1881 to 1891 he resided in Paris, exhibiting regularly at the Salon, afterwards becoming a member of the Society of American Artists, New York. Reinhart excelled in black-and-white, his oils and water-colors being mostly marine views, painted in sombre but delicate colors. In oil are: the "Old Life Boat" (1880); "Mussel Fisherwomen" (1886); "Washed Ashore" (1887), which won the gold medal (Philadelphia, 1888); and the "Rising Tide" (1888), purchased by the Government at the Paris Exposition, 1889. His water-colors include "Gathering Wood" (1877), "At the Ferry" (1878), and the "Spanish Barber" (1884). Among his chief series in black-and-white are the "Reichstag Sketches," "A Little Swiss Sojourn," and "Americans Abroad." Reinhart died in New York City, August 30, 1896.

REINHART, CHRISTIAN (1761-1847). A German landscape painter and etcher, born at Hof, Bavaria. First instructed by Œser in Leipzig, he studied at the Dresden Academy under Klengel, but chiefly after the Dutch masters, and in 1789 went to Rome, where he settled permanently and under the influence of Carstens and Koch became a conspicuous exponent of the historic landscape. His best work is represented by the "Eight Historic Landscapes" (1825), in the Palazzo Massimi, Rome, and "Four Views from Villa Malta," in tempera, painted for King Louis I. of Bavaria. The New Pinakothek in Munich contains "Four Views Near Rome" (two dated 1836, 1846), the Leipzig Museum a "Wood on Seashore in a Storm" (1824) and "Landscape with Psyche" (1829), the Städel Institute, Frankfort, a landscape with "Cain and Abel," and the Cologne Museum a "View from Tivoli." To a collection of seventy-two etchings of prospects in Italy, published conjointly with Dies and Mechau under the title *Malerisch radirte Prospecte aus Italien* (1792-98) Reinhart contributed twenty-four plates, the best of the series. Besides these he etched many other Italian landscapes, and thirty-eight animal studies, in all 170 plates. Consult: Baisch, *Reinhart und seine Kreise* (Leipzig, 1882); and Andresen, *Die Deutschen Maler-Radirer*, i. (ib., 1866).

REINHART VON GRÜNINGEN, fŏn grṳ'-nĭng-en. See GRÜNINGER, JOHANN.

REINHOLD, rĭn'hōlt, CHRISTIAN ERNST (1793-1855). A German philosopher, son of Karl Leonhard Reinhold, born at Jena. He at first lectured on philosophy at the University of Kiel, and afterwards was appointed professor of logic and metaphysics at the University of Jena. His philosophical system resembles Kant's. He published: *Geschichte der Philosophie nach den Hauptmomenten ihrer Entwickelung* (4th ed. 1584); *Theorie des menschlichen Erkenntnisvermögens und Metaphysik* (1832-34); *Lehrbuch der Geschichte der Philosophie* 3d ed. 1849), a work of much value; and *System der Metaphysik* (3d ed. 1854). Consult Apelt, *Ernst Reinhold und die Kantsche Philosophie* (Leipzig, 1840).

REINHOLD, KARL LEONHARD (1758-1823). A German philosopher, born in Vienna. In 1772 he entered the Jesuit College of Saint Anna, but upon the suppression of this Order in 1774 he joined the Barnabites, and was for some years an inmate of their College of Saint Michael. His religious zeal in the meantime had cooled considerably, and in 1783 he left the Order and went to Leipzig, where he devoted himself to philosophy. Afterwards he settled in Weimar. His contributions to the *Deutscher Merkur* attracted much attention, and in 1787 his *Briefe über Kantsche Philosophie* appeared in this periodical. His clear and eloquent exposition of Kant's doctrines, which at that time were being combated, resulted in his being appointed to a professorship of philosophy in Jena. In 1789 he published his chief work, *Versuch einer neuen Theorie des menschlichen Vorstellungsvermögens*, in which he attempts to broaden the teachings of Kant. He then for a time identified himself with Fichte's doctrines and even tried afterwards in his *Paradoxien der neuesten Philosophie* to find a middle way between Fichte and Jacobi in order to satisfy his religious sentiments, but when Bardili's logic appeared he deserted both and joined the latter's rational idealism. The reason for this change he gives us in his treatise *Wahrheit* (1820).

REINICK, rī'nĭk, ROBERT (1805-52). A German painter, etcher, and poet, born and educated in Danzig. He studied painting under Begas in Berlin and at the Düsseldorf Academy, and settled at Dresden in 1844. Several pleasing pictures, either historical or romantic in subject, had come from his brush after 1830—for example, "Rachel and Jacob at the Well" (Stettin Museum), "Well Near Olevano," and several others (Danzig Museum)—but his most interesting productions are those in which his pictorial and poetic talents are blended, such as "Drei Umrisse nach Holzschnitten von Dürer mit erläuterndem Text und Gesängen" (1830). With Kugler he published the *Liederbuch für deutsche Künstler* (1833), with woodcuts by Gubitz, and then the *Lieder eines Malers mit Randzeichnungen seiner Freunde* (1838), with thirty-one etchings by himself and other Düsseldorf artists. He supplied the poetical text to Rethel's "Dance of Death," and was associated with Ludwig Richter in editing Hebel's *Allemannische Gedichte* (1851), of which he gave a High-German version. A sixth edition of his collected *Lieder*, with a biography by Auerbach, was published in Berlin in 1873. His natural ability as a juvenile poet is well exemplified by the *Lieder und Fabeln für die Jugend* (2d ed. 1849), the *Illustriertes ABC-Buch für kleine und grosse Kinder* (4th ed. 1876), and the fairy-tale *Die Wurzelprinzessin* (1848). The poetical works for young people appeared collected under the title *Märchen-, Lieder- und Geschichtenbuch* (11th ed., Leipzig, 1895).

REINICKE, rī'nĭk-e, PAUL RENÉ (1860—). A German painter and draftsman, born at Strenz-Naundorf, near Halle. He studied at Weimar under Struys, at Düsseldorf under Gebhardt, and at Munich under Piglhein, whom he accompanied to Palestine. Settled afterwards in Munich, he found the true field for his talent in drawing sketches for the *Fliegende Blätter*, in which his masterly delineations from the social life of the upper classes in its various aspects soon became an eagerly looked-for specialty. A selection of

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his drawings was published in Munich (1890) under the title "Spiegelbilder aus dem Leben." His "Waiting Room of the First Class in the Munich Railway Station" is in the National Gallery, Berlin. He was awarded a gold medal in 1882.

REINKENS, rīn'kĕns, JOSEPH HUBERT (1821-96). The first Old Catholic bishop. He was born at Burtscheid, near Aix-la-Chapelle; studied theology at Bonn; was ordained priest of the Roman Catholic Church; and in 1853 was appointed professor of Church history at Breslau. In 1870 he united with Döllinger in the Old Catholic movement, was suspended by the Bishop of Breslau, and the students were forbidden to attend his lectures. In 1873 he was consecrated Bishop at Rotterdam by the Jansenist Bishop of Deventer. He soon took the oath of allegiance to the Government, and was recognized by Prussia as a Catholic bishop, with his residence at Bonn, and remained there in this capacity till his death. His publications include: *Hilarius von Poitiers* (1864); *Martin von Tours* (1866); *Revolution und Kirche* (1876); *Melchior von Diepenbrock* (1881); *Lessing über Toleranz* (1883). See OLD CATHOLICS.

REINMAR VON HAGENAU, rīn'mär fŏn hä'ge-nou (?-c.1210). A German poet, one of the first of the minnesingers, usually called Reinmar the Old. From Hagenau he went to Vienna and there taught Walther von der Vogelweide, with whom he may have made the Crusade of 1190. His poetry, artificial, sad, and 'pale-hued,' won him the title of the 'Nightingale of Hagenau' from Gottfried von Strassburg, a panegyric from his pupil Walther, and from Uhland high praise for its sentiment and diction. It is published in Lachmann and Haupt's *Des Minnesangs Frühling*. Consult: Schmidt, *Reinmar von Hagenau* (Strassburg, 1874); and Burdach, *Reinmar der Alte und Walther von der Vogelweide* (Leipzig, 1880).

REINSCH, rīnsh, PAUL SAMUEL (1869—). An American historical writer. He was born in Milwaukee, Wis., of German-American parents. He graduated at the University of Wisconsin in 1892, at the law school of the same institution in 1894, and after being admitted to the bar practiced for some time in Milwaukee. Returning to the State University in 1895, he became an instructor and extension lecturer in history, pursuing graduate studies at the same time, and taking the degree of Ph.D. in history in 1898. In 1899 he was appointed assistant professor of political science, and in 1901 professor of political science. His publications include *The Common Law in the Early American Colonies* (1899), *World Politics at the End of the Nineteenth Century* (1900), and *Colonial Government* (1901).

REINTHALER, rīn'tä-lĕr, KARL MARTIN (1822-96). A German composer, born at Erfurt. He studied music under A. B. Marx, and, later, in both Paris and Rome. In 1853 he was appointed teacher at the Cologne Conservatory, and in 1858 became municipal music director and cathedral organist at Bremen, where he also conducted the cathedral choir, the Singakademie, and the concert society. He retired in 1893. His best known works are the oratorio *Jephtha*, the *Bismarck-Hymne*, the choral works *In der Wüste*, and *Das Mädchen von Kolah*, and the operas *Edda* (1875) and *Kätchen von Heilbronn*, which gained a prize at Frankfort in 1881.

REIS, rīs, PHILIPP (1834-74). A German physicist, born at Gelnhausen. In 1858 he became a teacher in the Garnier Institute, near Homburg, and there, after two or three years of research, in 1860 he produced the first telephone. It transmitted musical tone, but not the intelligible utterances of the voice. Reis gained no benefit from his invention. In 1885 a monument was erected to him in his native town. Consult Thomson's English version of the biographical sketch by Schenk (London, 1883).

REISEBILDER, rī'ze-bĭl'dĕr (Ger., pictures of travel). A work by Heinrich Heine in four volumes (1826-31), in which poetic descriptions of nature and powerful delineations of character are mingled with scoffs at the institutions of the age, political, religious, and social. The wit and irreverence of these attacks, which respected nothing, together with the real beauties of the work, won for it an immediate success and brought the author into popular favor. Some of the poems interspersed through the work were published later with others under the title of *Buch der Lieder*.

REIS EFFENDI, rā'ĭs ĕf-fĕn'dĭ (Turk., presiding official). A title formerly given to an officer of State in the Ottoman Empire. He was the Chancellor of the Empire, and Minister of Foreign Affairs. His duties in the first-mentioned capacity was to confer with the Grand Vizier regarding the orders and instructions to be sent to the different provinces and regarding the proper decision on any subject affecting the Empire, whether internal or external; and in the latter capacity he had the sole and exclusive charge of the relations of the Porte with foreign courts.

REISKE, rī'ske, JOHANN JAKOB (1716-74). A celebrated German philologist and Oriental scholar. He was born at Zörbig, Prussian Saxony, and was educated at the University of Leipzig, where he devoted much attention to the study of the Semitic languages, especially Arabic. In 1758, after living in abject indigence, he obtained the rectorship of the Nikolai Gymnasium, in Leipzig, and he retained the post till his death. From 1758 he devoted his attention chiefly to Greek literature, in which he became a recognized authority. His works, which are very numerous and are remarkable for their learning, include his *Animadversiones in Græcos Auctores* (1757-66), and editions of Theocritus (1765-66); of the Greek orators (1770-75); of Maximus Tyrius (1774-75); of Dionysius of Halicarnassus (1774-77); of Plutarch, with notes and translations (12 vols., 1774-82); Dio Chrysostom (1784-98); and Libanius (1791-94). Reiske was also the first to call attention to the historical and æsthetic value of Arabic literature. His chief work in this field was his Latin translation of the *Annales Moslemici* of Abulfeda (1754; frequently reëdited). Some of these works, and his correspondence with Moses Mendelssohn and Lessing, were published after his death, by his wife, Ernestine Christine Reiske (1735-98). Consult: Morus, *Vita Reiskii* (Leipzig, 1777); Reiske, *Selbstbiographie* (Leipzig, 1793); and Haupt's *Opuscula* (Leipzig, 1875-76).

REISS, rīs, WILHELM (1838—). A German traveler and naturalist, born at Mannheim. He

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traveled in the Azores, Madeira, and Canary Islands in 1858-60, in Greece in 1866, and with Stübel in 1868-76 explored South America. In particular he visited Ecuador, Colombia, Peru, and Bolivia, and he and Stübel were the first to ascend Mount Cotopaxi. The scientific results of this journey were of much value. Reiss was president of the Berlin Gesellschaft für Erdkunde in 1885-87, and of the Anthropological Society in 1888. In addition to contributions to the publications of the Gesellschaft für Erdkunde and various scientific journals, he wrote: *Das Totenfeld von Ancon in Peru* (1880-86); *Geologische Studien in der Republik Columbia* (1892-99); and *Das Hochgebirge der Republik Ecuador* (1892-1902).

REISSIGER, rīs'sĭg-ẽr, KARL GOTTLIEB (1798-1859). A German musician, born at Wittenberg. He studied under Schicht at the Thomasschule at Leipzig, and dramatic composition under Winter at Munich. He taught at the Berlin Royal Institute, and in 1826 went to The Hague, where he organized a conservatory which is still prosperous. This same year he succeeded Marschner as musical director of the German Opera at Dresden, and later was appointed Kapellmeister, as Weber's successor. He wrote: *Didone abbandonata* (1823); *Die Felsenmühle von Etalières* (1829), the overture of which is still played at concerts; *Turandot* (1835); *Adèle de Foix* (1841); masses, psalms, symphonies, overtures, sonatas for violin and 'cello, and the oratorio *David*. *Weber's Last Thought*, a waltz, is his most popular piece.

REISSMANN, rīs'mán, AUGUST (1825-1903). A German writer on music, born at Frankenstein, Silesia. He studied at Breslau under Mosewius, Baumgart, Richter, Lüstner, and Kahl. From 1866 to 1874 he lectured on the history of music at the Stern Conservatory in Berlin, from 1880 at Leipzig, and later at Wiesbaden. *Das deutsche Lied in seiner historischen Entwickelung* (1861) is his best and most original work. His other historical works, mostly clever collections or extracts from original studies made by others, include: *Von Bach bis Wagner* (1861); *Allgemeine Geschichte der Musik* (1863-65); *Illustrierte Geschichte der deutschen Musik* (2d ed. 1892); and the biographies of various composers. He also composed an oratorio, *Wittekind*, two operas, symphonies, chamber music, and songs.

REITBOK (from Dutch *rietbok*, reedbuck, from *riet*, reed + *bok*, buck). One of the small antelopes, called by English sportsmen in Africa 'reedbucks.' See REEDBUCK.

REJ, rā'y', MIKOLAJ (1505-69). A Polish poet and prose writer, born in the Ukraine. He was more than sixty years of age before he produced his principal poem, *Zwierciadlo* ("The Mirror," 1567, reprinted in 1829). Nine years previously his *Wizerunek wlasny zywota czlowieka poczciwego* ("Picture of an Honorable Man," 1558, reprinted at Warsaw, 1881-88) had appeared, and besides metrical Polish translations of the Psalms (1533), *Postylla Polska* (Gospel Commentaries, 1556), and a catechism, he published *Zywot Józefa* (1545), *Zwierzyniec* (1562), and *Figliki* (1568). A stout Calvinist, he wrote much in defense of his chosen creed and was one of the first to use Polish as a literary language. His prose shows the language in its purity, before the introduction of foreign words and forms.

RÉJANE, rā'zhän', MADAME (1857—). The stage name of Gabrielle Réju, a French actress, born in Paris. She made her début at the Vaudeville in 1875, and soon gained a reputation for her witty impersonations. In 1892 she married M. Porel, then her manager. In 1893 she created her best-known rôle of *Madame Sans Gêne*, written for her by Sardou. She appeared with it in London in 1894, and in the United States in 1895. Afterwards she appeared in *La douloureuse* and *Zaza*.

REJECTED ADDRESSES. Burlesque poems by James and Horace Smith, published anonymously in 1812. Ostensibly unsuccessful efforts in the competition for the opening of the new Drury Lane Theatre at that time, they were amusing parodies on the poems of Wordsworth, Southey, Coleridge, Byron, Scott and others.

REJOINDER (OF., F. *rejoindre*, to rejoin, from Lat. *re-*, back again, anew + *jungere*, to join). In common-law pleading, the answer of a defendant to a plaintiff's replication to his (defendant's) plea. See PLEADING.

REJUVENATION, or REJUVENESCENCE. It is supposed by Maupas and others that the process of conjugation in the Infusoria (q.v.) results in increased vigor and vitality, and is thus advantageous to those organisms in which the most primitive form of reproduction is by simple self-division. Indeed it has been observed that conjugation results in increased activity in multiplication by fission. So also sexual reproduction is a rejuvenizing process, and tends to prevent both the individual and the species from deteriorating or running out. It may be said to correspond in its effects to cross-fertilization, which is the antidote to too close in-breeding and tends to enhance the vitality of the species and prevent degeneration. In botany, a transformation of one cell into another, i.e. into a primordial cell, which afterwards secretes a new cell-wall, and forms the starting-point of the life of a new individual. Examples occur in numerous algæ (Œdogonium), and also in certain diatoms. See GROWTH.

RELAPSE, THE; OR VIRTUE IN DANGER. A comedy by Sir John Vanbrugh, produced in 1697. It was written as a sequel to Cibber's *Love's Last Shift*, and was very popular throughout the eighteenth century. It was imitated by Lee in *A Man of Quality* (1776), and recast by Sheridan as *A Trip to Scarborough* (1777). Voltaire used it as the basis of *Le Comte de Boursoufle* (1734). Later versions were made by Hollingshead in *Man of Quality* (1870) and Buchanan in *Miss Tomboy* (1890).

RELAPSING FEVER (from Lat. *relapsus*, p.p. of *relabi*, to fall back, from *re-*, back again, anew + *labi*, to slip), FAMINE FEVER, or FEBRIS RECURRENS. A specific infectious and contagious disease, generally occurring in epidemics, and due to a micro-organism, the *spirochætæ Obermeieri*. This organism is a spirillum, about $\frac{1}{500}$ of an inch in length, and undergoing constant movements of a rotary or lashing character. The disease occurs in times of famine and flourishes under conditions of overcrowding, dirt, and poverty. Individuals in constant contact with the disease, as physicians, nurses, and clergymen, are often

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attacked. The peculiar nature of the malady was pointed out by Henderson in 1842 and by Sir W. Jenner, 1849 to 1851. Their views have since been confirmed by the discovery of the specific micro-organism by Obermeier.

The period of incubation of relapsing fever averages from 4 to 10 days. The fever begins suddenly with a chill or rigor, accompanied by frontal headache, and pains in the back and limbs. The temperature may be 103° or 104° F., and mounts on the succeeding days to 105° or even 108°. The general condition remains much the same for about a week, except that the symptoms increase in severity. Little sleep is obtained, but the mind remains clear until near the end of the paroxysm, when delirium supervenes. When all the symptoms are at the height, crisis suddenly occurs in 5 to 7 days, with profuse perspiration and a rapid abatement of suffering. Convalescence now sets in and is permanent in many cases. In others the patient feels comparatively well, but very weak until about fourteen days from the initial attack or seven days after the crisis, when he is again seized with chills and fever, and the whole series of phenomena is repeated. This relapse is usually shorter than the first paroxysm, and permanent recovery follows it in the majority of cases.

The spirilla are always present in the blood during the paroxysms and increase in number as the fever progresses. They disappear at the crisis and remain absent until near the advent of the relapse. During this period they may be found in the spleen and bone marrow (as proved by experiments on monkeys), where they probably break down and leave spores which germinate and thus produce the organisms which determine the relapse.

No treatment has succeeded in shortening the paroxysms or preventing the recurrence of a relapse; and although certain drugs, such as quinine, carbolic acid, and iodine, arrest the movements of the spirillum outside the body, they have no influence when given as remedies. Treatment must be symptomatic. Sponging with tepid water or packing in wet sheets will give temporary relief when the fever is very high, and headache may be relieved by cold applications. During the severe perspiration of the crisis the patient must be kept as dry as possible, and the tendency to collapse must be met by additional coverings, hot bottles, and diffusible stimulants. For the severe pains opium or morphine is given. Cooling drinks and gentle saline laxatives increase the comfort of the patient. During convalescence, fresh air, good food, and tonic medicines are indicated. The disease is rare in this country, no epidemics having appeared since 1869, when it prevailed extensively in New York and Philadelphia. It is common in India, where favorable conditions for its development seem always to be present.

RELATIONS (Lat. *relatio*, relation, reference, report, restoration, from *re-*, back again, anew + *latus*, p.p. assigned to *ferre*, to bear, carry). In law, technically, such kindred of a person as may be entitled to share in his personal estate under the statute of distributions in force in the jurisdiction in which the meaning of the word is called in question. The word, therefore, is employed in a wider sense in some jurisdictions than in others, and the classes of persons included vary according to the jurisdiction. It is popularly employed to describe all family connections by blood or marriage, and the law will recognize this use of the word where it is evident a person so intended to employ it. See AFFINITY; CONSANGUINITY; LINEAL. See also Blackstone's *Commentaries*.

RELATIONSHIP. The exact degree of affinity existing between keys, chords, and tones. See TEMPERAMENT.

RELATIVITY (from Lat. *relativus*, having reference or relation), LAW OF. In its most general form, the law, as given by Stumpf, is that the relation of sensations to one another is essential to their very existence; so that black, e.g. can be sensed only in opposition to white, or at least only in distinction from a grayer or blacker black; a tone or noise only as alternating with other tones or noises, or with complete silence, and so on—while every sensation will disappear under the operation of uniform and continuous stimulation. Simple as this statement looks, it is capable of many interpretations, none of which can be regarded as unexceptionable.

The grain of truth which Stumpf finds in the doctrine is that the presence of sensation in the adult consciousness is almost without exception connected with certain judgments of its relation to other ideas. And these judgments (apprehensions, apperceptions), if they cannot alter the content of sensation, can at least render it confusable with other contents not now sensed. Wundt, on the other hand, has consistently maintained that our mental life is governed by a law of relativity, such that every phase of present experience is conditioned not only by other phases of the same experience, but also by the whole past history of consciousness. The laws of mind at large are of two classes: laws of relativity and laws of development. Under the heading of relativity we have (1) the law of psychical resultants, which affirms that every mental complex shows properties which, once given, can be understood from the attributes of its elements, but which cannot be regarded as a mere sum of those attributes. (2) The law of relations asserts that every dissection of a conscious whole into its constituent terms is an act of relating analysis. Finally, (3) the law of psychical contrasts maintains that mental processes of opposed direction mutually reinforce one another. The laws of mental development are (1) the law of mental growth, the application of the law of resultants; (2) the law of heterogony of ends, based upon the laws of resultants and of relations; and (3) the law of development by opposites, which applies the law of contrasts. Consult: Stumpf, *Tonpsychologie* (Leipzig, 1883); Riehl, *Der philosophische Kriticismus*, vol. ii. (ib., 1879-87); Preyer, *Elemente der reinen Empfindungslehre* (1877); Wundt, *Outlines of Psychology* (trans. Leipzig, 1897); id., *Physiologische Psychologie* (4th ed., ib., 1893); Höffding, *Outlines of Psychology;* Spencer, *Principles of Psychology* (London, 1881); Bain, *The Senses and the Intellect* (ib., 1868).

RELEASE. In the most general sense, any act, event, or instrument by which a legal right is discharged. In this sense of the term a right of action based upon a personal tort may be re-

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leased by the death of the tortfeasor, or a debt released by the discharge in bankruptcy of the debtor, as well as a bond or a right of entry upon land released by the deed of the person claiming the right. Lord Coke, in his commentary upon Littleton, enumerates a considerable number and variety of releases in vogue in his day, most of which have, in the growing simplification of the law of real property, become obsolete. We may, perhaps, conveniently distinguish two separate and distinct types of releases as still existing, viz. the ordinary release of a debt or obligation and the release of an interest in or claim to land.

The former of these may be effected by act of the parties, or by operation of law—as where a contract for personal services is terminated by the death of a party thereto. At common law, however, the forgiveness of a debt, whether complete or partial, is not legally binding if made by parol or simple contract, but requires a release under seal to render it effectual and irrevocable.

The second form of release above referred to is best described as a form of conveyance of real property at common law. Its distinguishing characteristic is the fact that it is in and by itself not available for effecting a conveyance to a stranger, i.e. to one having no interest in the land in question (for which purpose the feoffment or the grant must be resorted to), but only to one in privity of estate, i.e. having an interest with the releasor in the same parcel of land, as a wife to the husband's grantee, or a landlord, remainderman, or person asserting any other claim in relation to the premises to a tenant in possession. The act of the tenant in giving up his estate to the landlord is not a release, but, involving as it does a transfer of the possession, is conceived of as of a totally different character, and is effected by a distinct form of conveyance, called a surrender.

In this form of a conveyance of the landlord's estate to his tenant in possession the release played a distinguished part in the history of conveyancing. In the effort to attain to a simpler and less notorious method of conveying freehold estates than the ancient and cumbrous process of livery of seisin, the lease and release were ingeniously combined in a single transaction. Thus, if the land to be sold by A to B was first leased to B for a year, B would by taking possession of the land come into the requisite privity of estate with A to enable the latter to complete the transfer of title by releasing his reversion to B. Consult Blackstone and Kent, *Commentaries*. See also PROPERTY; LEASE AND RELEASE; CONVEYANCE; DEED; GRANT, and the authorities there referred to.

Analogous to the first form of release above described, but still operating as a common-law conveyance, is its use to convey doubtful or precarious interests in land or rights in land which do not rise to the dignity of estates, as a contingent remainder to the freeholder who was seised of the land, or the right of a disseisee to the disseisor or other person seised of the land. See DISSEISIN; ENTRY, RIGHT OF; REMAINDER.

In form the deed of release is substantially reproduced in the modern quitclaim deed. See QUITCLAIM.

RELIANCE. An American racing yacht, and the successful defender of the America's Cup in the International yacht races of 1903. She was built by Herreshoff, for a syndicate of American yachtsmen, represented by C. Oliver Iselin. Her measurements were: Length over all, 143.69; water line, 89.66; sail area as per rule, 16,159.45; sail area, 127.12. Owing to her large sail area she was required to give the challenger Shamrock III. (q.v.) a time allowance of one minute and fifty-seven seconds. She was sailed by Captain Barr, the skipper of the old Columbia, and defeated her opponent in the first three races of the series as follows: August 22d, by 7 minutes and 3 seconds, corrected time; August 26th, by 1 minute and 19 seconds, corrected time; September 3, the challenger got lost in the fog and did not finish the race. Reliance alone completed the course.

RELICS (OF., Fr. *relique*, from Lat. *reliquiæ*, remains, from *relinquere*, to leave behind, from *re-*, back again, anew + *linquere*, to leave, Gk. *λείπειν*, *leipein*, Skt. *ric*, to leave). In ecclesiastical usage, the remains of the bodies of saints; more loosely, objects connected with the earthly life of Christ or of the saints. At an early period miracles are described as connected with relics, as in the Old Testament (II. Kings xiii. 21). Saint Ambrose tells of a blind man's sight being restored by his touching the bodies of the martyrs Gervasius and Protasius, and similar wonders are detailed by other saints. Altars were early erected over the tombs of the martyrs, and the present practice of the Roman Catholic Church requires the inclusion of some relic or relics within every altar to be consecrated.

The veneration of relics found no important early adversary. One of the treatises of Saint Jerome, indeed, is directed against the objections of Vigilantius on this point; but even the Iconoclasts, while vehemently repudiating the use of images, admitted the veneration of relics, and, with the exception of the Waldenses, Wiclif, and some others, it was practically unchallenged until the sixteenth century, when Protestants generally repudiated it entirely as superstitious. The decree of the Council of Trent connects the question with the general one of the veneration to be paid to the saints, and regards the relics of the saints not as possessing any intrinsic virtue, but as instruments through which God bestows benefits on men. Various alleged relics of Mohammed and other Moslem worthies are preserved at Mecca, Medina, Constantinople, and other places; and several sanctuaries in India are supposed to be the resting-places of relics of Buddha. See SAINT; CROSS; HOLY COAT; PILGRIM.

RELICT PLANTS (OF. *relict*, from Lat. *relictus*, p.p. of *relinquere*, to leave behind). Plants of very restricted distribution, but formerly more widespread. For example, the big trees of California are the remnants of a former widely distributed group. The term may also be applied locally to species which belong to a former topographic condition when they were abundant. Naturally or artificially reclaimed swamps may yet retain isolated relict plants.

RELIEF (Lat. *relevamentum*). An incident of the feudal tenure of lands. It consisted in the obligation of the heir to redeem the land from the lord of whom it was held, in order to make good his right of inheritance. Unlike the

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more burdensome incidents of wardship and marriage, it attached not only to lands held by knight's service, but was levied equally on the heir of socage lands. Originally of indefinite amount and depending largely on the arbitrary will of the lord, it was at an early period fixed and regulated by statute. Of all the incidents of feudal tenure, it had the longest life, not only surviving the gradual disappearance of military tenures, but being expressly saved in the statute of 12 Charles II. (1660), which abolished tenure in chivalry and relieved all tenures of their more burdensome incidents. The right of relief was never expressly abrogated, but it has fallen into desuetude in England, and there is no evidence that it was ever exercised in the United States. See FEUDAL TENURE; INCIDENT.

RELIEF SCULPTURE. That form of sculpture in which the objects represented project from the surface or background. In the fine arts the term relief is used to signify any projection of figures from the surface; it is so used in painting for the apparent projection of forms and masses from the background, in architecture for projection of decoration, and in a similar manner in ceramics, goldsmith's work, etc. The term is, however, mostly employed in reference to sculpture. Relief sculpture differs from sculpture in the round in that it is attached to the background, from which the latter stands free, being visible from all sides. It is not always possible, however, to distinguish the boundaries between these two chief classes of sculpture. See SCULPTURE.

The two principal varieties of relief sculpture are: high relief, usually known by the Italian name *alto-relievo* (q.v.), in which the objects project strongly from the background; and low relief (Italian, *basso-relievo;* French, *bas-relievo*), a surface ornamentation in which the projection is very slight. Midway between the two is semi-relief (Italian, *mezzo-relievo;* French, *demi-relief*), in which the figures are fully rounded, but without detached portions. *Stiacciato* (Italian, crushed, flattened) is the slightest form of relief, being little more than scratchings upon the surface, while in the hollow relief (*cavo-relievo*) (q.v.) the contours of the figures are carved below the surface of the background. In nearly all relief work figures and background are of the same material, though there are some examples to the contrary in best Greek art, and in Chinese and Japanese decorative work. The materials generally used in larger relief work are marble, bronze and sometimes terra cotta, and in smaller decorative work the precious metal and stones, enamel, ivory, wood, etc., are more common. Reliefs were almost universally colored by the Egyptians and in classical antiquity and partly in early Christian art. This practice prevailed in wood, terra cotta and stucco work during the Gothic and Renaissance periods, while marble and stone were not usually colored.

HISTORY. Relief is that form of sculpture which most resembles painting, with which it has composition and perspective in common. In the history of relief work, therefore, the practice has swayed between purely plastic and pictorial principles. Relief was practiced contemporaneously with sculpture in the round by the early culture peoples, like the Babylonians, Assyrians, and Hittites. The Egyptians made a very wide use of *cavo-relievo*. The Greeks conceived relief in a purely plastic sense and achieved the highest mastery of it. Distinguishing strictly between high and low relief, they used the former between the triglyphs, and in the tympana of the temples, but the latter in friezes, grave stones, and the like. Purely decorative principles were strictly followed, the space being adequately filled, the background never carved, and the heads of the figures at the same height. (See GREEK ART.) During the Hellenistic period a more picturesque and dramatic composition was practiced, and subjects were carved in the backgrounds—a practice which in Roman times degenerated into the use of several different planes of reliefs. Picturesque relief attained its most perfect development at Florence during the Renaissance, in such works as the Baptistery doors of Ghiberti and the marble pulpit of Santa Croce by Benedetto da Majano. In these works all the qualities of painting except color were reproduced. Donatello, Luca della Robbia and other sculptors of the Renaissance followed plastic laws more strictly, but during the entire Baroque period, picturesque principles prevailed to such an extent as to preclude any real style of relief. At the beginning of the nineteenth century Thorwaldsen, inspired by the study of Attic grave monuments, brought back relief to its proper plastic function. Since that time excellent relief work has been done in Europe by modern German sculptors like Rauch and Rietschel and by Frenchmen, like Jules Dalou, and also in the United States. The present tendency, however, is to neglect the distinction between high and low relief and to give rather undue emphasis to pictorial qualities.

RELIEF SYNOD. See PRESBYTERIANISM.

RELIGIO MEDICI (Lat., A Physician's Religion). A prose work by Sir Thomas Browne (1643). Written about 1635, but not for publication, which was necessitated by an unauthorized edition in 1642, this prose poem is the devout musing of a scholar and man of science, and withal a mystic, who sought a Divine presence in nature and in all conditions of his own life. The first part treats of Faith and Hope. The second, on Charity, shows a tolerance unusual in that day.

RELIGION (Lat. *religio*, probably from *religare*, to bind fast, from *re-*, back again, anew + *ligare*, to bind), COMPARATIVE. The science which treats of religions from an historical and comparative point of view. Its methods are first descriptive, then historical, and finally comparative. The descriptive part of comparative religion discusses in detail the actual phenomena, or any particular phenomenon, presented by religions, and includes treatments of individual religions. Even in such an individual discussion, the comparative method must be employed if the phenomena presented by the religion in question are to be correctly interpreted. While the descriptive part of the science is confined, strictly speaking, to the statics of religion, that is, to the phenomena observable at any specified time, the historical aspect considers the development of a single faith from its origin or from its earliest ascertainable manifestation to its extinction, or absorption into other religions, or the latest development which it has attained. The historical side of comparative religion, therefore, is evolutionary in character. The com-

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parative study in the strict sense of the term may, technically, be static. The value of such an investigation is, however, so much inferior scientifically to evolutionary comparison that it may practically be ignored. By far the greater number of investigations make their studies of comparative religion historical or evolutionary. Such discussions alone lead to the final object of the science. This object is to investigate the nature and development of religious beliefs and to discover if possible the origin of religion itself. Comparative religion therefore ranks as one of the historical sciences.

Definition of Religion. Nowhere is definition more difficult than in the sphere of religion. The manifestations are so varied, and the causes, where they can be traced, are so complex, that almost no definition of religion can be given which is altogether free from objection. The definition which seems on the whole least open to adverse criticism is as follows: Religion is the view held by man of an intelligent being or beings which is or are, or which he conceives to be, superhuman, and of the relation, modifiable by his own agency in certain respects and by certain means, which he sustains toward the being or beings in question. This definition recognizes the two-fold aspect of religion, which accounts for part of the complexity of religious phenomena, the theoretical and the practical. The theoretical side of religion is the view held by man regarding the nature and character of the superhuman being or beings in which he believes. The practical side is the power which such being or beings exert over him and the power which he has or may acquire over them.

Universality of Religion. The statement which is still made, though with decreasing frequency, that there are races or tribes without religion is almost certainly false. It may be true that many peoples seem to possess no religion, either because these religions are so obscure as to pass unnoticed, or because they are contemptuously rejected as false. Yet even the scientific investigator may be misled in this matter. In the first place, the person questioned as to his religion may not, and in the case of savages often does not, understand the questions which are asked him. His answers, therefore, are misleading. It must also be remembered that one questioned concerning his religion will sometimes willfully give a false answer, either because he regards the inquiry as foolish, impertinent, or tiresome, or because he does not dare to reveal his religion. In giving a knowledge of his religion, one gives a part of himself, and the power thus gained by another may be used to his own detriment. If these obstacles to an accurate knowledge of a religion exist in the case of living faiths, they hold to a far greater degree in the study of extinct religions or extinct phases of them. The ancient writers who describe foreign religions were either little acquainted with them and unscientifically trained, as were even Herodotus and Plutarch, or were contemptuous and unsympathetic, as was Tacitus. Moreover, the sacred books of religions give us only a partial view of their own faiths. They represent only the officially sanctioned religion, while the popular deviations from these book-religions are either ignored altogether, or mentioned with disparagement and hostility, or must be partially reconstructed from chance allusions scattered through the canonical works. There is also a marked tendency both in ancient and in modern investigators of religion to interpret foreign religions in terms of their own, thus leading to false identifications and to attributions of concepts to religions which they may not contain. The student of religion must also guard against mistaking an idea previously imported into a religion from a foreign source for an integra part of the faith which he studies.

Classification of Religions. Still more difficult than definition of religions is classification. While one may make rough distinctions between various religions, hard and fast lines of demarcation can seldom be drawn, for religions often overlap one another in attributes common to both. Nor is it easy to classify a religion according to its salient feature. To say that Greek religion is the cult of the beautiful, or that Roman religion is legalistic, or that American religions are animistic, does not adequately describe them, for they represent the culminations of long evolutions, in which many factors from many sources have coöperated. Animism, totemism, ghost-worship, nature-worship, and other factors, all combine in different proportions. Several classifications, however, have been proposed. Of them all, the most simple and the most worthless divides religions into true and false, the first class holding the single religion adopted by him who makes the classification, the latter class containing all the rest. There are a number of other classifications which are equally unsatisfactory. Among these may be enumerated the division of religions on a linguistic basis into Indo-Germanic, Semitic, and Turanian. This classification, proposed by Max Müller, proceeds on the false premise that religion and linguistic affinity are one. A religion may indeed originate in a certain race, but it may spread with equal facility to other races, and even to other climates and entirely different systems of civilization. The division into national and universal or international religions, advocated by Kuenen, is also objectionable, since there is no real line of demarcation between the two. Comparatively primitive religions may be international, on account both of their catholicity and of the absence of any national idea, while very advanced religions, as Zoroastrianism, may be strictly national, although apparently intended to be international in scope. Hegel attempted a classification, in four divisions. The most primitive faiths, or nature religions, he regarded as spontaneous. To them he opposed the religions of spiritual individuality, which was differentiated from nature religions by the presence of reason and meditation. Within the religions of spiritual individualities there are three divisions: First, the religion of majesty, where the divine overwhelms the human; second, the religion of beauty, where the divine blends with the human; and third, the religion of design, where a divine purpose in the universe is recognized. The increased knowledge of the evolution of religion since Hegel's time has rendered this view of his useless. A marked advance was the classification of Hartmann, who made a broad division into naturalism and supranaturalism. Naturalism is characterized by a belief that deities rule in the world and require material representations, while in supra-

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naturalism the deities rule over the world, and are freed from the necessity of representation. In the former class are primitive religions and such advanced ones as the Greek, Roman, Teutonic, and Egyptian, while in the second category come, among others, Buddhism, Judaism, and Mohammedanism. The final stage is a monism where the absolute spirit is a unity which is the absolute source and being of the universe. The chief weakness of the system is the tendency already noted to characterize religions only by salient features, without taking into account phases equally important though less obtrusive. A classification which combines the historical and philosophical points of view was prepared by Réville. Making a broad division into polytheistic and monotheistic religions, he included in the first category primitive nature religions, animism, and fetishism. These were followed by national mythological religions, such as the Chinese, Egyptian, Babylonian, Teutonic, Celtic, Greek, and Roman. The fourth stage is characterized by the legal element, as seen in Brahmanism, and here he also reckoned the Chinese systems of Confucius and Lao Tse. The highest point of polytheism was reached in his opinion by Buddhism. The monotheistic religions, which compose his second main division, are Judaism, Mohammedanism, and Christianity. Against this classification may be alleged that (1) there is no such sharp dividing line between animism, fetishism, and mythology as is here implied, and (2) the demarcation between polytheism and monotheism is evanescent. In the religions of Egypt, Babylonia, India, and Greece, which were admittedly polytheistic, a monotheistic trend, especially among philosophers, was marked, and conversely, in religions essentially monotheistic, such as Zoroastrianism, there is a tendency toward reversion to or survival of polytheistic cults. The important step in advance in Réville's classification is his recognition of the importance of the legal factor. Tiele set up a scale of primitive, naturalistic, animistic, national, polytheistic, nomistic, and universal religions. This scheme later was somewhat modified by him, and he finally favored a division into nature religions and ethical religions. Still another classification was proposed by Jastrow. Its division is fourfold, into the religions of savages, of primitive culture, of advanced culture, and those religions whose conscious ideal is the coextensiveness of religion with life and complete harmony between the doctrines and the practices of religion. This classification, like the others, is unclear in the distinction between the first two divisions, while the third and fourth in like manner are somewhat arbitrary. It seems, however, superior on the whole to all its predecessors, despite the credit which the classifications of Tiele and Réville deserve. Adopting this system of Jastrow's, then, with the modification of combining his first two divisions, the broad outlines of the principal forms of religion may be sketched, while the detailed treatment both of individual religions and of numerous special phases of comparative religion will be found under separate titles.

THE RELIGIONS OF SAVAGES AND OF PRIMITIVE CULTURE. The religion of the savage, connoting by this term man in the pre-cultural stage, is almost impossible to determine. The difficulties already enumerated oppose the solution of this problem. It is, moreover, a question whether pre-cultural man, uninfluenced by cultural races, however primitive, now exists. Only within comparatively recent times has the intercommunication of ideas between the less civilized races both of ancient and modern times received due recognition. Even the most primitive religions known, such as the Australian, belong to tribes which have begun the cultural stage. We are reduced, therefore, for our knowledge of savage religions to deductions which may be made from more advanced cults, especially those of primitive peoples. This uncertainty is the more unfortunate, since it is here if anywhere, from a scientific point of view, that we are to seek the origin or origins of religion. The most that can be said of this most primitive stage seems to be that there was probably an innate germ of religious thought, a vague personification of the powers of nature, and the first beginnings of a belief in ghosts.

Turning to the religions of primitive culture, we find a wide range of cults in all parts of the world, of most varied grades. Among the most important may be mentioned the Polynesian and Australian, the diverse native religions of Africa, the Finno-Tataric, many phases of Hindu religion, especially among the Dravidians, the Mongolian Shamanism, the ancient Teutonic religions, and the American religions, including those of Mexico and Peru. The diversity of the primitive cults is evident, ranging from the rude religions of the Hottentots and Blackfellows to the elaborate mythology of Polynesia and the developed ritual and priesthood of Mexico. The religions of primitive culture, however, may all be characterized by at least four points in common: animism in belief, magic in practice, and in worship nature-worship and ancestor-worship. Of these the most primitive seems to be animism. This may be defined as a belief which ascribes conscious life to every natural object which manifests vitality or force in any way. It is the theory evolved by primitive man to account for the various natural phenomena by which he is surrounded. The ascription of life analogous to his own to trees, rivers, fire, and the like is not necessarily religious in itself, but the transition from animism in theory to animism in cult seems to involve a recognition of their superhuman powers. If a river is endowed with life as is a man, it has power to benefit, as in irrigation, or to injure, as in flood, and it becomes necessary either to propitiate the river that it may be bounteous in its waters, or to induce it to refrain from destructive floods. The primitive means of controlling the powers of nature is by magic. If the desired results do not follow the performance of magic, the fault is not with the magic itself. Either wrong magic has been employed for the end in view, or there is a strong counter-magic at work, which must first be overcome if possible. For magic is, in its last analysis, the science of primitive man, the cause, real or supposed, of a given result, which must, by its performance, produce again the desired result, and this fact accounts for its early importance and its extreme tenacity.

Within the sphere of religion proper we have, as common to all religions of primitive culture, nature-worship and ancestor-worship, the developed forms of the beliefs in animism with magic and ghosts with magic respectively. To

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this same stage of development belong some of the most important aspects of religion. As an evolution of ghost-worship comes the belief in totemism, which derives whole tribes or families from an animal or plant. This animal or plant is consequently regarded as a blood-relative of the tribe or family in question, and therefore becomes sacrosanct, so that it is neither eaten, killed, nor harmed in any way by one whose totem it is. Another mixture of magic and animism is seen in fetishism, which ascribes superhuman properties to material objects. Developments of magic are seen in the important phenomena of taboo and Shamanism. To this same period belongs the evolution of the priest. While the savage was able to perform his own religious rites, the increase both in number and complexity of sacrifices and magic rites rendered necessary the presence of a body of men who stood in especially close relations with the superhuman beings, and who came in course of time to have entire control both of cult and religion. As intermediaries between the gods and men, the priests naturally came to be regarded as healers of disease by their magic arts, and the knowledge of medicine was, consequently, practically in their possession alone throughout this period and at least the earlier portion of the succeeding one.

THE RELIGIONS OF ADVANCED CULTURE. In the religions of advanced culture, which, as has already been said, are closely connected with those of primitive culture, are contained the religions of Egypt, Babylonia and Assyria, China, India (excluding Buddhism), Greece, and Rome. It is at once obvious how varied are the spirits of these religions, yet there is one common factor which may serve to characterize them all, and which may, at the same time, be made a line of demarcation between the faiths of advanced and of primitive culture. This factor is the predominance of mythology over animism and magic. While the mythological element is of importance in many of the religions of primitive culture, and while it is seen at a comparatively early stage, it is overshadowed by animism and magic, and plays relatively little part. Even in the most highly developed religions of this class, such as the Polynesian, which has a mythology almost rivaling that of the Greeks, this statement holds good. On the other hand, while the religions of advanced culture, especially the more ancient ones of Egypt and Mesopotamia, contain abundant traces and instances of animism and of magic, even in their early epochs the mythology is the most striking feature. Mythology in itself is a process and a proof of higher culture. Based in part on early tribal history and ancestor-worship, as may clearly be seen in the case of Greece and Rome, and in part on nature-worship, as is evident in India, it involves a power of abstract thought beyond the capability of primitive culture in its early stages. But, on the other hand, mythology is a check on religious growth. As the people progresses in religious life and thought, while mythology, like ritual, remains stationary or moves much more slowly than the actual popular religious faith, a constantly widening gap appears between religion and mythology. As in the religions of primitive culture the animism and magic which characterize them in their earlier stages become relatively less important in their later developments, so in the religions of advanced culture the mythology which is at first their leading feature becomes more and more secondary in course of time. In many instances in a more refined community the old myths are felt to be immoral. Attempts are, therefore, made to explain away this immorality, to which the masses still cling tenaciously, by poetical, allegorical or esoteric interpretations as in the explanations of the erotic Krishna myths in India as mystic portrayals of divine love. Yet these explanations are, in the nature of the case, inadequate, and there is thus created a division between religion and ethics, which it is the task of the next and final stage of religion to bridge over.

The priesthood undergoes a marked change in the religion of advanced culture. In the previous stage the priests had been little more than go-betweens between men and gods. With the fuller development of religious ideality, however, their place became more truly spiritual. Not alone did they conserve the rites and doctrines of religion, but they became the censors of morals as well, and in the course of time they made the important step of giving a legalistic form to religion as distinguished from its merely ritualistic aspect. Yet side by side with the religions thus officially recognized which prevailed in Babylonia and Assyria, Egypt, Greece, and Rome, and which still prevail in China and India, there was, and is, a vast amount of religion officially unrecognized. This, expressed both in belief and custom, is regarded by the religion which is formally acknowledged as superstitious. The attitude toward it, however, is one rather of contempt than of hostility. Gradually the feeling seems to have gained ground that such a distinction between religion and superstition was distinctly injurious. More and more it became evident that religion, which was outgrowing the beliefs of animism and even of the more tenacious magic, could and must progress still further. The next step marks the transition to the religions of the last type, the highest that has thus far been evolved.

RELIGIONS COEXTENSIVE WITH LIFE. Within this class fall the religions of Judaism, Buddhism, Zoroastrianism, Mohammedanism, and Christianity, with a few minor representatives, such as Mormonism. These represent, as already stated, the conscious attempt to render religion and life coextensive, whereas the religions of primitive culture had assumed them to be one, and the religions of advanced culture had finally divorced them. They thus attempt to create final harmony between religious doctrine and religious practice. There is no longer a tacit admission of the usefulness of superstition, such as exists in the religions of advanced culture, but since everything in the spiritual world not with religion is now seen to be against it, there is a deliberate resolve to annihilate all such extra-religious forces. More than this, not alone are the lower forms of religion existing within itself regarded as hostile, but all other religions are considered as lower, and therefore to be suppressed. It is an important fact that each of the five religions in this class regards itself as true and the other four, together with all lower religions of whatever sort, as false. Herein lies one of the chief characteristics of the class. The religions coextensive with life are exclusive, all

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others are inclusive. Another distinction between the two types lies in the fact that if the earlier is ethical and legalistic, the latter is spiritual. The religions coextensive with life lay more weight on the spirit of man in its relation with the divine, and less, relatively speaking, on cult and ritual. A striking example of this is seen in the origin of Buddhism, which is essentially a revolt from the excessive rituality of Brahmanical Hinduism toward a deep spirituality with, in its pure form, almost no cult. As the maintenance of a priesthood is conditioned in a great measure by an elaborate cult, it is obvious that in this final type, conspicuous for simplicity of ritual, the priest occupies a far less important position than in the religions either of primitive or advanced culture. This affords in part the explanation of the fact that the reforms which have resulted in religions of the highest type have been made in every case by individuals outside the priestly code, by the Hebrew Prophets, by Buddha, Zoroaster, Mohammed, and Jesus. Nor is this in any way a reproach to the priest. For he is in the nature of things a conserver, not an inaugurator, and rightly so, and if in some instances he is shown by the results to have been over-cautious, he is not thereby to be convicted either of dishonesty or of ignorance. Finally, religions of this class go further than the individual or than the State, herein contrasting sharply even with the religions of advanced culture. They aspire to be world-religions, and three of them, Buddhism, Mohammedanism, and Christianity, are in fact the leading religions in numbers and extent. We have in this aspiration yet another characteristic distinction between the religions coextensive with life and all other forms of religious cult.

History of the Study of Comparative Religion. The study of comparative religion is of modern origin. It is indeed true that we find in the histories of Herodotus, in the *De Iside et Osiride* of Plutarch, in the *De Dea Syria*, generally ascribed to Lucian, in the *Germania* of Tacitus, and in brief mention in numerous other classical authors accounts of religions other than Greek or Roman. Yet here, as might be expected, the historic knowledge was too slight to render the philosophical part of the work anything but superficial, although the descriptive part is still of value. The general attitude of the Greeks and Romans, who alone of the ancient world touched the subject of comparative religion, is one of contempt. This was succeeded by a not unnatural intolerance in the attitude of the Church Fathers and mediæval theologians. This attitude remained practically unchanged until the rise of skepticism in the eighteenth century. Yet there was no real progress in the study of religion, for dogmatism was succeeded by superficiality. It is noteworthy that the first real impulse to an historical study of religions came with the sixteenth and seventeenth centuries. To this early period belong such books as the *Pansebeia, or View of All Religions in the World*, of Ross (London, 1653), and the *Ceremonies and Religious Customs of the World*, of Picart and Bernard (ib., 1733). This latter work is in a sense the forerunner of the historical method of religious study, and is far superior to one of its most important successors, the *Origine de tous les cultes ou religion universelle* of Dupuis (Paris, 1795). The real founder of the historical school, however, was Herder, who outlined the history of religion, so far as it was then possible, in his *Ideen zur Philosophie der Geschichte der Menschheit*, published in 1784, although his previous writings indicate that many of his ideas on this subject had been formulated much earlier. The year after Herder's *Ideen* saw the publication of Meiners's *Grundriss der Geschichte aller Religionen*, followed twenty-one years later by his *Allgemeine kritische Geschichte der Religionen*. In the decade 1821-31 the foundations of a scientific philosophy of religion were laid by Hegel in his *Vorlesungen über die Philosophie der Religion* (not published, however, until 1832). The credit of inaugurating the study of comparative religion in a truly scientific spirit and method, however, must be given to Max Müller, even though his views are now in great part rejected in the light of later investigations. In a long series of volumes, including *Lectures on the Science of Religion* (London, 1872), *Natural Religion* (2d ed., ib., 1892), *Physical Religion* (ib., 1890), *Anthropological Religion* (ib. 1891), and *Theosophy or Psychological Religion* (2d ed., ib., 1899) he developed his system. He also aided in the establishment of the Hibbert Lectures on the Origin and Growth of Religion in 1878, and above all founded in 1879 the epoch-making series of translations entitled *The Sacred Books of the East*. A still greater name than Max Müller's is that of Tiele, of Leyden, whose *Outlines of the History of Religion* (translated from his Dutch *Hoofdtrekken der Godsdienstwetenschap* into English by Carpenter, London, 1877, 3d German ed. by Weber and Söderblom, Breslau, 1903) is by all odds the best general survey of religions from an historical and descriptive point of view, while his *Elements of the Science of Religion* (Edinburgh, 1897-99) and his *Geschiedenis van den Godsdienst in de oudheit tot op Alexander den Groote* (Amsterdam, 1891-97) are no less authoritative. In France the study of comparative religion received a powerful impetus in the establishment in 1888 of the Musée Guimet. In America there is as yet little general interest in this science, although signs are not lacking that comparative religion will receive here also the attention which it merits both from a theoretical, an historical, and a practical point of view. The activity in the science, despite the lack of recognition on the part of many universities and the unfounded suspicion with which it is viewed by certain classes even of the educated, is most promising, among the eminent investigators being Réville, of France; Saussaye, of Holland; Achelis and Edmund Hardy, of Germany; Tylor and Frazer, of England; and Toy and Jastrow, of America.

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RELIGIOUS EDUCATION. See SCHOOLS.

RELIGIOUS ORDERS. See ORDERS; MONASTICISM.

RELIGIOUS SOCIETIES. In a legal sense, those corporations formed for the advancement of religion or the administration of church property for religious purposes. To the efforts of religious corporations in the Middle Ages to acquire vast holdings of land was due the enactment of the various Statutes of Mortmain (q.v.). Most of the States of the United States now have general laws governing the formation of religious corporations and defining their powers. Generally there is no limit to their power of acquiring land for church purposes and all their property used directly for church or religious purposes is exempt from taxation. See CORPORATION; CANON LAW; and compare CIVIL CHURCH LAW and CLUB.

RELIQUARY (ML. *reliquare, reliquarium,* from Lat. *reliquiæ,* remains). A case or box to contain relics. Reliquaries are made of all kinds of materials, such as wood, iron, stone, ivory, silver, enamel, gold, and crystal, and are frequently ornamented with costly jewels. Shrines are of the same description, but are on a larger scale and are permanent. As a class they are the most consummate masterpieces of mediæval minor artists, especially among the metal-workers. Some of the cathedral and church treasuries still possess numerous mediæval reliquaries, for example, San Marco at Venice, and the cathedrals of Aix-la-Chapelle and Cologne. The reliquary in the form of a church at the Cathedral of Orvieto is one of the most wonderful pieces of thirteenth-century goldsmith work, with exquisite details. The Romanesque and Gothic periods were the golden age of such work (eleventh to fifteenth centuries). At first the Rhenish and Flemish schools were easily preeminent, but in the thirteenth century Italy and France surpassed the northern schools. Reliquaries were of many shapes. They often took the form of the relic they contained, such as a hand, a foot, or a head. They were nearly always decorated with minute figures in relief or even statuettes, or with colored enamels and ornamental designs. The Renaissance led to a complete decadence.

RELIQUES OF ANCIENT ENGLISH POETRY. A collection of old ballads and lyrics (1765), taken by Thomas Percy from an old manuscript of the early seventeenth century, which he found at a friend's house in Shiffnal, Shropshire. These ballads he altered and polished to suit the taste of his age, for which he was severely criticised. Ritson charged Percy with forged and garbled versions of many ballads, and even questioned the existence of the manuscript. This, however, was proved by an edition from the original in 1868 by Hales and Furnivall. In spite of Percy's inaccurate and unscholarly work, the *Reliques* has been a source of pleasure for generations and marks the revival of taste for romantic poetry.

REL/LY, JAMES (c.1722-78). A Universalist minister. He was born at Jeffreston, Pembrokeshire, Wales, was converted under Whitefield in 1741, and became an itinerant Methodist preacher. Being convinced that Universalism was true, he parted company with the Methodists, and preached independently in various places. In 1761 he settled in London and preached there, without much success. It was, however, under him that John Murray (q.v.), the Apostle of Universalism in the United States, was converted.

REMAINDER (OF. *remaindre,* remain, from Lat. *remanere,* to remain, from *re,* back + *manere,* to stay). The fee tail, the life estate, and the term of years are conceived of as being less in quantity than a fee simple (see ESTATE), and the gift of such an estate leaves something —some part of the fee simple—undisposed of, which may remain, or revert back, to the grantor (in which case it is called a *reversion*), or may be given by the same deed which creates the lesser estate to a third person as a *remainder.* There may, indeed, be any number of remainders, one

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after the other, until the entire fee simple has been disposed of, as, for example, after a present, or 'particular,' estate to A for life, remainder to B for life, remainder to C for life, remainder to D in fee tail, leaving still a fee simple to be given to E as a final remainder, or to come back to the grantor as a reversion. A remainder thus given to an ascertained person, ready to go into effect upon the determination of the precedent estate, is said to be *vested*. If given to an unborn or unascertained person, or upon a further contingency (as, when B shall return from abroad), it is a *contingent* remainder. Such a remainder was at common law scarcely of sufficient importance to be regarded as an estate at all. It was incapable of alienation to a stranger and was liable to be extinguished by the accidental or deliberate determination of the precedent estate before the contingency had happened on which the remainder was to vest. But modern legislation has given the contingent remainder much of the definiteness and permanence of the vested remainder by freeing it from this dependence upon the precedent estate.

Though classified as a future estate, a remainder is conceived of as a present interest and as capable of being dealt with as such by the owner thereof. It may thus be alienated like any other property (though, being 'incorporeal,' it has always required a deed of grant to convey it), and, being real property, it will, if a remainder in fee, descend to the heirs of the owner. Although efforts have been made in some of the United States to wipe out by legislation the distinction between remainders and other future estates, these have not completely succeeded, and the distinction is still of fundamental importance in this country as well as in England. See ESTATE; FUTURE ESTATE; PROPERTY.

Consult: Digby, *History of the Law of Real Property* (Oxford, 1875); Fearne, *The Law of Remainders;* Leake, *Law of Property in Land* (London, 1874); Blackstone and Kent, *Commentaries.*

REMAINDER THEOREM. An algebraic principle of great service in factoring. The theorem may be stated thus: If $f(x)$ is a rational integral algebraic function of x, then the remainder arising from dividing $f(x)$ by $x - a$ is $f(a)$. Since the dividend equals the product of the quotient and the divisor plus the remainder, we have $f(x) = q(x - a) + r$, and if $x = a$, the equation becomes $f(a) = r$. Similarly the remainder arising from dividing $f(x)$ by $x + a$ is $f(-a)$. When the remainder is zero the division is exact, hence the divisor is a factor of the given function. E.g. $x^n + y^n$ is divisible by $x + y$ when n is odd, since the remainder $(-y^n + y^n) = 0$. The rational binomial factors of functions above the second degree are readily determined by use of the remainder theorem and synthetic division. E.g. to factor $a^3 - 6a^2 + 11a - 6$, it is only necessary to substitute, for a, factors of the absolute term -6. Using detached coefficients (see COEFFICIENT), the division by $a - 1$ may be performed thus:

$$\begin{array}{rrrr} 1 & -6 & +11 & -6 \\ & 1 & -5 & 6 \\ \hline 1 & -5 & +6; & 0 \end{array}$$

Whence the factors are $(a - 1)(a^2 - 5a + 6)$ or $(a - 1)(a - 2)(a - 3)$.

REMAK, rā'mâk, ROBERT (1815-65). A distinguished German physiologist and embryologist, born at Posen. He studied at Berlin; in 1847 was privat-docent at Berlin, and was elected professor extraordinary in 1859. Besides important work on the physiology of the nerves, he, with Kölliker, further elaborated the germ-layer theory. His chief embryological work was *Untersuchungen über die Entwicklung der Wirbeltiere* (1851-53).

REMBRANDT, rĕm'brânt, properly REMBRANDT HARMENSZ VAN RIJN, här'mĕns văn rīn (1606-69). The chief master in painting and etching of the Dutch school. The date of his birth is disputed, the most probable conclusion being that he was born at Leyden, July 15, 1606. His father, Harmen Geritsz van Rijn, a well-to-do miller, sent him to a Latin school, preparatory to the university, but finally permitted him to follow his inclinations for painting. After studying with his relative, Jacob van Swanenburgh, at Leyden, he was for six months a pupil of Pieter Lastmann at Amsterdam, from whom he learned the technique of etching, and whose influence was decisive upon his art. He was a very precocious genius, and upon his return to Leyden he soon acquired a high reputation. About 1631 he removed to Amsterdam, where he speedily became the most fashionable portrait painter, and had many pupils. Among his patrons were Frederick William, the Prince of Orange, and Burgomaster Jan Six; the foremost men of the day, like the poet Jeremiah Decker and Constantin Huygens, were his friends and associates. He bought a fine house in the Breedstraat, which he equipped with quaint costumes, weapons, and the like, and which contained his remarkable art collection, especially rich in old Netherlandish prints. He possessed paintings of Giorgione, Raphael, Michelangelo, and even antique sculptures.

A very important event in Rembrandt's life was his marriage in 1634 with Saskia Uylenburgh, a young lady of wealthy and influential Amsterdam family. Their happy married life was the inspiration of many of his best works. After her death in 1642, he drew back even more from the world, especially after his financial misfortunes, which censorious biographers have ascribed to dissipation and extravagance. But although it is true that he expended a large sum upon his art collection, his misfortunes are rather to be ascribed to the hard times then prevailing in Holland, and to the change in public taste. In 1657 his creditors sold his wonderful collection, including several of his own paintings, for the pitiful sum of 5000 florins, and in 1658 his house for 11,000. But Titus, Saskia's son, and Hendrickje Stoffels (or Jaghers), a young woman who had become his housekeeper in 1649, formed a partnership for the disposal of Rembrandt's pictures, and rented a house in the Rozengracht, paying the artist a stated yearly salary. After ten years of toil the old artist satisfied his creditors. The stories of his dissipation and low associates in later life are unfounded. His chief associates were artists and he was interested in the inhabitants of the Ghetto; but he also had more influential friends, like Jan Six. Hendrickje died in 1664, leaving a daughter Cornelia, and Titus in 1668. Rembrandt himself was buried in the Westerkerk, Amsterdam, on October 8, 1669.

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The world has never produced a more original artist than Rembrandt. In theory and in practice he was the great antipode of what was considered the standard art of his day—the Italian. He knew no model, except nature. His conception of nature was essentially poetic and picturesque, but at the same time virile. The most prominent technical characteristic of his work is a marvelous rendition of light, through which he emphasized the important part, leaving the rest in luminous shadows. At first he painted in full light, but after 1633 he preferred the inclosed light of the studio. Everything appears in subtle harmonies of gold and brown. His early pictures are painted with detailed execution and light color; but he increasingly uses a broader brush and richer color, and later in life his painting becomes highly impasto, almost decorative in character. He exercised great influence upon the art of his day, and a more lasting one upon the art of the nineteenth century. Among his many pupils were Gerard Dou, Govaert Flinck, and Ferdinand Bol.

Rembrandt was preëminent in portraiture, and no artist has succeeded better in rendering the head in a realistic, characteristic, and at the same time in a picturesque manner. Among his numerous portraits, perhaps the most interesting are those of himself and of his wife, Saskia. A charming picture is that of the young couple in an affectionate position at breakfast. The best known examples of Rembrandt's portraits are those of 1633, 1634, and 1637 in the Louvre; of 1635 in the Liechtenstein Gallery, Vienna, and in the National Gallery, London; of 1641 in Buckingham Palace. In later life he painted those in Munich (1658), National Gallery (London), and several in English private possession. The best known portraits of Saskia are at Dresden and Cassell; of Hendrickje Stoffels at Berlin; of his mother in Windsor Castle; of his son Titus and of his sister in the Imperial and Liechtenstein galleries, Vienna. Among other famous portraits are: a "Money Changer" (1627, Berlin); the "Polish Nobleman" (1631, Saint Petersburg); the poet Krul (1633, Cassel); the "Mennonite Preacher Aanslow Consoling a Woman" (Berlin Museum); the so-called "Frame-Maker" (Havemeyer Collection, New York, 1640); "Burgomaster Pancras and His Wife" (1645, Buckingham Palace); "Jan Six" (1654, Amsterdam); the "Ship Architect and His Wife" (in possession of the King of England); the so-called "Jewish Bride" (Amsterdam); and the "Architect" (1656, Cassel). Of his "Rabbis" a fine example is in Buckingham Palace; of his numerous "Old Women," the best known are in London and Saint Petersburg. Examples of his work may be seen in this country in the Metropolitan Museum, New York.

Rembrandt's most ambitious efforts in portraiture were groups similar in character to those of Hals. The masterpiece of his earlier full-light treatment is the well-known "Anatomical Lecture" (1632, The Hague). It represents the anatomist Nicholas Tulp, who ordered the picture, making a post-mortem examination before a group of his associates. The heads are wonderfully expressive, and the dead body is treated in a manner at once realistic and delicate. On a still larger scale is his masterpiece of the second period, painted for the Town Hall and now in the Amsterdam Museum. The fine treatment of chiaroscuro created the erroneous opinion that it represented a "Night Watch," by which title it is generally known, but it is, in reality, a portion of the civic guard issuing forth in broad daylight. His third chief work of this character is "De Stallmeesters" (1662), a representation of the presidents of the clothiers' guild, in the same museum—simple and harmonious in treatment, and showing the more sombre coloring of his last period.

Like the Italians of the fifteenth century, Rembrandt depicted religious subjects in apparel of the day, and chose especially the inhabitants of the Ghetto in their picturesque Oriental costumes. They are characterized by high dramatic power, and by deep religious feeling, of that homely and effective kind typical of the Dutch Calvinistic Church. Among the principal examples are the "Presentation of Christ in the Temple" (1631, The Hague); the "Descent from the Cross" (1633, Munich); "Samson Threatening His Step-Father" (1635, Berlin); the "Angel Leaving Tobias" (1637, Louvre); "Samson's Wedding" (1638, Dresden); the "Sacrifice of Manoah" (1641, ib.); "Reconciliation of Jacob and Esau" (1642, Louvre); "The Disciples of Emmaus" (1648, Louvre); "Jacob Blessing His Grandsons" (1656, Cassel); and "Return of the Prodigal Son" (Saint Petersburg). His mythological pictures make no endeavor to attain classic form or beauty, but strive for pure pictorial effects. Some of them, like the "Rape of Ganymede" (Dresden), even seem to burlesque the subjects. More serious examples are "Diana and Endymion" (Liechtenstein Gallery, Vienna); the "Rape of Proserpina" (Berlin); and "Danaë" (Saint Petersburg). The dozen landscapes which Rembrandt painted display the same poetic feeling and technical skill as his figure subjects. With emphasis of the essentials he has portrayed the beauty of the flat country about Amsterdam. The best known example is "The Mill," in possession of Lord Lansdowne (London); other examples are at Brunswick, Cassel, Dublin, etc.

Rembrandt was probably the most consummate etcher of all times, and held his rank on purely technical as well as artistic grounds. His etchings possess the harmony, tone, and poetry of his pictures, and whether sketchy or highly finished they are always masterpieces. Among his best known prints are the "Descent from the Cross" (1637); "Christ Healing the Sick;" "Christ Preaching;" "Burgomaster Jan Six;" and the well-known "Landscape with Three Trees." Examples of his prints, as well as of his admirable drawings, may be found in the Louvre, Albertina (Vienna), and British Museum, in the museums of Berlin, Dresden, Munich, Holland, and in several private collections.

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REMBRANDT
"THE SYNDICS OF THE DRAPERS," FROM THE PAINTING IN THE RYKS MUSEUM, AMSTERDAM

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REMEDIOS, rā-mā'dē-ōs, or SAN JUAN DE LOS REMEDIOS. A town in the Province of Santa Clara, Cuba. It is situated 30 miles northeast of Santa Clara, and 5 miles from the port of Caibarién, with which it is connected by rail, as it is with all the important towns of the island (Map: Cuba, F 4). Population, in 1899, 6633.

REMEDY (from Lat. *remedium*, cure, from *re-*, back again, anew + *mederi*, Av. *mad*, to heal). In law, the means by which the violation or invasion of a legal right is either prevented, redressed, or compensated. The term in fact is the correlative of the term legal right, there being in general no right without a corresponding remedy for its violation. The term remedy, however, does not include punishment, and therefore has no application in the criminal law.

The various forms of remedy afforded by the law may be classified as: (1) Remedy by act of the injured party, or self-help; (2) remedy by operation of law; (3) remedy by action or suit.

(1) Remedy by the act of the injured party includes all those rights conferred by law on private persons to protect themselves or their property from injury, and in certain cases to redress wrongs done, without recourse to legal proceedings. In general, remedy by act of the party, or self-help, is permitted by law whenever the remedy afforded by action would be less effective and when the privilege thus accorded to the individual to take the law into his own hands is not inconsistent with sound public policy. Thus, in general, one may defend his person and property from unlawful attacks provided he use no more force than is necessary to accomplish that result. (See SELF-DEFENSE.) One who has been unlawfully deprived of his property may upon fresh pursuit forcibly retake the property, but if the pursuit is not made immediately following the wrongful taking, or if the property has passed into the hands of an innocent holder, his only remedy is by action to recover the property or damages for its conversion. Other forms of remedy by act of the injured party are distress, right of entry, and abatement of a nuisance.

(2) There is perhaps but a single true example of remedy by operation of law, and that is the ancient doctrine of *remitter*, which may briefly be stated as follows: At common law one who was dispossessed of his real estate under certain circumstances had a mere right of action to recover his property; he had no right to reënter upon the property and thus acquire possession, his sole remedy being by action. If, however, he became entitled to the property by inheritance or purchase through the person wrongfully in possession, he was entitled to possession of the property, and upon taking possession under his new but defective title, he might then retain possession by virtue of his valid title. He was then said to be remitted to his rights under the valid title. The doctrine is of slight importance in modern practice.

(3) Remedy by action is the relief or redress afforded to one whose legal right has been invaded, by means of a legal proceeding carried on in a court having jurisdiction over the subject of the suit and the parties to it. See PROCEDURE and ACTION.

For the discussion of the varied forms of remedies, see such titles as DISTRESS; FORCIBLE ENTRY AND DETAINER; NUISANCE; EQUITY; CHANCERY; COMMON LAW, etc., and consult the authorities referred to under some of these titles.

REMEDY OF LOVE, THE. (1) A poem of the sixteenth century wrongly ascribed to Chaucer, and printed in the edition of 1532. (2) A paraphrase of Ovid's *Remedy of Love* by Sir Thomas Overbury, printed in 1620.

REM'ENSNY'DER, JUNIUS BENJAMIN (1843—). An American Lutheran (General Synod) clergyman, born in Staunton, Va., and educated at Pennsylvania College, Gettysburg (class of 1861), and at Gettysburg Theological Seminary (1865). He held pastoral charges in Philadelphia, in Savannah, Ga., and in New York City; labored for the union of Lutheran sects, which was largely accomplished through his service, and published *Doom Eternal* (1880), *Luther, His Work and Personality* (1883), *Six Days of Creation* (1886), and a *Lutheran Manual* (1892), which came into common use.

REMÉNYI, rē'mān-yē, EDUARD (1830-98). An Hungarian violin virtuoso. He was born at Heves, and studied the violin under Joseph Böhm at the Vienna Conservatory, 1842 to 1845. He took part in the insurrection against Austria in 1848 and fled from Hungary. He came to the United States in 1849, but in 1853 went to Weimar, and thence to England, where he was appointed solo violinist to Queen Victoria. In 1860 he was pardoned by the Austrian Government and returned to Hungary. He afterwards traveled extensively and visited Canada, Mexico, China, Japan, France, and Germany. He ranked among the foremost musical artists of his day, although his style was frequently so exaggerated as to mar the high standard of his work. In technique he has had few rivals. He died while on an American concert tour.

RE'MI. A powerful people of Belgic Gaul, who alone of the Belgæ formed an alliance with Cæsar in his campaign of B.C. 57. Their capital became the modern Rheims.

REMIGIUS, rē-mij'ī-ūs. See REMY.

REM'INGTON, FREDERIC (1861—). An American sculptor, artist, and author, born at Canton, N. Y. He was educated at the Vermont Episcopal Institute, the Yale Art School, and the Art Students' League, New York City. Afterwards he lived on a ranch in the West. His pictures of Western subjects, especially cowboys and soldiers, soon became very popular. His statuettes include "The Broncho Buster" and "The Wounded Bunkie." They are spirited bronzes, executed with much technical skill, and his horses are notably fine. His stories also deal with Western life, and are illustrated by himself. They include *Pony Tracks* (1895), *Crooked Trails* (1898), and *Sundown Leflare* (1899).

REMINGTON, PHILO (1816-89). An American manufacturer and inventor, born at Litchfield, N. Y. He studied at the Cazenovia Seminary and then entered his father's arms factory at Ilion, N. Y. During the Civil War the Remingtons supplied small arms to the Federal Government, and at its close they formed a corporation under the title E. Remington & Sons. Soon afterwards they began to manufacture the breech-loading rifle which bears their name. In 1873 the firm secured the right to one of the first typewriters, but subsequently the manufacture both

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of typewriters and of rifles passed into other hands.

REMIREMONT, re-mēr'mōn'. A town in the Department of Vosges, France, on the left bank of the Moselle (Map: France, N 3). The residence building of the old abbey has been rebuilt and is now used as the hôtel de ville. There is a trade in Vosges cheese. Cotton goods, embroideries, and ironware are manufactured. Population, in 1901, 10,322.

REMITTENT FEVER (from Lat. *remittens*, pres. part. of *remittere*, to send back, from *re-*, back again, anew + *mittere*, to send). A form of malarial fever characterized by a regular lowering of the temperature, which, however, always remains above the normal point. In this respect it differs from intermittent malaria, in which there is an interval of entire absence of fever (apyrexia); and from the continuous variety, in which the body heat remains continuously elevated. The causative agent in remittent fever is the estivo-autumnal variety of the *plasmodium malariæ* of Laverau. (See MALARIA.) The severer forms of remittent fever prevail in the Southern States and in tropical countries. They are found in Southern Asia, Western Africa, Central America, and the West Indies. The disease is sometimes, though improperly, called bilious remittent fever. The symptoms of this type are very severe and characterized by typhoid or cachectic features such as occur in the worst cases of intermittent fever, viz. coma, delirium, vomiting, collapse, and hemorrhages from various parts of the body. In certain localities cases occur in which hæmoglobinuria (the presence of altered blood in the urine) is a prominent symptom. The urine assumes a port-wine color, or becomes almost black, the patient is jaundiced, and in fatal cases death takes place from suppression of urine with coma, or from collapse or syncope.

A milder type of remittent fever is seen in temperate climates, especially in the late summer and fall. The symptoms are much less pronounced than those of typical intermittent fever, and consist of loss of appetite, nausea, chill, slight jaundice, and a colorless diarrhœa. The chill is not severe and may appear only once in the course of an attack, which lasts from a few days to two or three weeks. The temperature is not unlike that of a mild typhoid fever (q.v.), and the disease is not infrequently mistaken for typhoid.

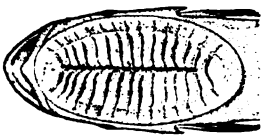
The treatment of remittent fever is the same as that of other forms of malarial fever. Quinine in doses proportioned to the severity of the attack acts as a specific. Tonics must also be given and attention paid to the general health. See INTERMITTENT FEVER.

REMONSTRANTS. See ARMINIANISM.

REMORA (Neo-Lat., from Lat. *remora*, delay, from *re-*, back again, anew + *mora*, delay), or SUCKING-FISH. A fish of the family Echeneididæ, interesting because of its commensal habit. The remoras attach themselves to sharks and other large fishes by a sucking-disk on the top of the head. They have an elongated body, covered with very small scales; one soft-rayed dorsal fin, situated above the anal fin; the head flattened and covered with an elongated disk extending back beyond it, which exhibits numerous transverse cartilaginous laminæ directed backward, and has a free flexible broad margin. These laminæ are formed by modification of the spinous processes of a first dorsal fin, and when

THE WEST INDIAN REMORA (*Rhombochirus osteochir*).

they are raised after the margin of the disk has been closely applied to a smooth surface, a vacuum is created; and so powerful is this apparatus that great weights may be dragged by a remora, while it obstinately refuses to let go its hold. A remora thus attached to a shark or turtle may be carried about for weeks, leaving its host only to secure food, injuring the shark in no way save, perhaps, by the slight check its presence gives to the shark's speed in swimming. In Madagascar native turtle-catchers put a ring about the narrow caudal end of the remora's body, attach a line to this ring, and thus use the fish for catching turtles. Several species of the family are known, dwelling in all the warmer seas. They are mostly small fishes, one or two feet in length, and of plain colors, or striped lengthwise in brown and white. One (*Remora brachyptera*) is occasionally caught as far north as Cape Cod. A rarer form is *Rhombochirus osteochir*, which attaches itself to spearfishes (Tetrapturus). More numerous is the closely related species called 'shark-sucker' (*Echeneis naucrates*). (See SHARK-SUCKER.) Consult Jordan and Evermann, *Fishes of North and Middle America* (Washington, 1898).



SUCKING-DISK OF A REMORA.

REMPHAN. A word which occurs in Acts vii. 43 in a passage quoted from the Septuagint text of Amos v. 26. In Amos the reading is Chiun, which is evidently intended either as the name of a heathen deity or as a symbol of idolatrous worship, and is generally explained as the Babylonian name of the planet Saturn (see CHIUN). Why Remphan (Raiphan, Rephan in some texts) should be substituted in the Septuagint is hard to explain. The attempt to connect it with an Egyptian name for Saturn is not satisfactory. A plausible suggestion is that it represents a misreading or alteration of the Hebrew.

REMSCHEID, rĕm'shīt. A city in the Rhine Province Prussia, 19 miles northeast of Cologne (Map: Prussia, B 3). It has several fine technical schools. Remscheid's manufactures are mainly small steel and iron wares (tools, scythes, skates, etc.), in which industry it ranks first in Germany. There are also machine shops, rolling mills, and manufactures of silk ribbons. The city carries on a large export trade chiefly with America, Russia, and the Orient. Remscheid is first mentioned in 1132. Its industries were stimulated by Protestant refugees from Holland and France. Population (commune), in 1890, 40,371; in 1900, 58,108.

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REM'SEN, IRA (1846—). An American chemist, born in New York City. He graduated from the College of the City of New York in 1865, from the College of Physicians and Surgeons, New York, in 1867, and received his Ph.D. from the University of Göttingen, Germany, in 1870. From 1870 to 1872 he was assistant in chemistry at the universities of Tübingen, Munich, and Göttingen, Germany; and from 1872 to 1876, professor of chemistry and physics in Williams College. In 1876 he was made professor of chemistry in Johns Hopkins University, and in 1901 succeeded Dr. Gilman as president of the university. Dr. Remsen has carried out a number of important investigations in both inorganic and organic chemistry. He is editor of the *American Chemical Journal,* founded by him in 1879. His book-form publications include the *Principles of Theoretical Chemistry* (4th ed. 1892); *Organic Chemistry* (latest edition 1899); *Introduction to the Study of Chemistry* (1885); and the *Elements of Chemistry* (1887). Remsen's text-books have passed through many editions in this country and have been republished in England and translated into several foreign languages. They form a remarkably clear exposition of the fundamental principles of the science and are well known among students of chemistry both in this country and abroad.

RE'MUS. The brother of Romulus and cofounder of Rome.

REMUS, UNCLE. A character invented by Joel Chandler Harris in *Uncle Remus; His Songs and Sayings* (1880), and other stories. He is an old plantation darky, who entertains the son of his mistress with quaint stories of the doings of Bre'r Fox, Bre'r Rabbit, and other animals, illustrating their various traits and interspersed with shrewd philosophy. The author used the folk tales current among negroes in the southern part of the United States, and several of his stories aroused the curiosity of those interested in folklore.

RÉMUSAT, rā'mụ'zä', CHARLES FRANÇOIS MARIE, Count de (1797-1875). A French politician and philosophic historian, born March 14, 1797, in Paris. He was the son of Claire Elisabeth Jeanne Rémusat (q.v.). Rémusat studied with brilliant success, and in 1818 began his career as a journalist and supporter of Guizot. He contributed constantly to *Le Globe* from its establishment in 1824. From 1830 to 1848 he was Deputy, and for brief periods Under-Secretary of State (1836) and Minister of the Interior (1840). After the revolution of February, 1848, he was elected to the Constituent and Legislative Assemblies, and became an opponent of Louis Napoleon, by whom he was exiled after the coup d'état. He was amnestied in 1859 and devoted himself to literature and science. From 1871 to 1873 he was Minister of Foreign Affairs. The most noteworthy of his writings are *Essais de philosophie* (1842), *Abélard* (1845), *Passé et présent* (1847), *L'Angleterre au XVIII. siècle* (1856), *Bacon* (1858), *Hartley* (1874), *Histoire de la philosophie en Angleterre depuis Bacon jusqu'à Locke* (1875). After his death were published six volumes of *Correspondance pendant les premières années de la Restauration* (1883-90).

RÉMUSAT, CLAIRE ELISABETH JEANNE GRAVIER DE VERGENNES, Countess de (1780-1821). A writer of memoirs, born in Paris. She was a grand-niece of Vergennes, Prime Minister under Louis XVI., a noted beauty of the Court of Napoleon I., and an intimate friend of Josephine. As wife of Count Augustin Laurent de Rémusat, chamberlain of Napoleon, and as *dame de palais,* she was acquainted with the intimate life of the Napoleonic Court, of which she left an account in her *Mémoires* published long after her death (1879). She was also the author of an *Essai sur l'éducation des femmes* (1824).

RÉMUSAT, JEAN PIERRE ABEL (1788-1832). A French Orientalist, born in Paris; the son of a surgeon. His father taught him Latin, which he wrote and spoke with great ease. He took up Chinese and unaided brought out in 1811 his *Essai sur la langue et la littérature chinoises.* He received his degree as a physician at twenty-five, and served in the military hospitals. A chair of Chinese having been established at the Collège de France in 1814, Rémusat was appointed to it. He was made a member of the Academy in 1816, and in 1818 succeeded Visconti as editor of the *Journal des Savants.* He was one of the principal founders of the Société Asiatique of Paris in 1822, and was long its secretary. He translated and wrote a good deal, many of his shorter productions appearing in the *Moniteur* and other periodicals, as well as in the *Journal* of the Asiatic Society. He died of cholera in Paris. His principal works are: *Livre des récompenses et des peines* (the Chinese *Kanying-pien*), with notes and illustrations (Paris, 1816); *L'invariable milieu* of Tsz'-tse (1817); *Description du royaume de Camboge* (1819); *Histoire de la ville de Khotan,* to which is appended a treatise in which he endeavors to show that jade is the jaspis of the ancients (1820); *Eléments de la grammaire chinoise* (1822); *Mémoire sur la vie et les opinions de Lao-tse* (1823); *Mélanges asiatiques* (1825); *Iu-Kiao-li,* or "The Two Cousins" (1826); *Recherches sur les langues tartares* (1829); *Nouveaux mélanges asiatiques* (1829); and *Foë Kouë Ki, ou relations des royaumes bouddiques* (a translation of the travels of the Buddhist pilgrim Fa-hien, unfinished at the time of his death, but revised, completed, and supplemented by Klaproth and Landresse, and brought out in 1836). Consult Silvestre de Sacy, *Notice sur la vie et les ouvrages de Rémusat* (Paris, 1834).

RÉMY, rā'mē', CAROLINE (1855—). A French journalist, best known by her pseudonym of Séverine. She was born in Paris, and in 1880 met in Brussels the communard Jules Vallès, with whom she wrote for Paris papers, and, after 1883, for his *Cri du Peuple.* On Vallès's death Mlle. Rémy married Guebhard, a co-editor of the *Cri du Peuple,* which for several years was carried on under her supervision, in the meantime turning from socialism to philanthropic sentimentalism. Besides she appealed for many charities in the columns of the *Figaro, Gil Blas, Gaulois,* and *Petit Journal.* In the nineties she made herself famous by publishing an interview with Leo XIII., and in 1896 by a bitter personal warfare with Rochefort.

REMY, or **REMI,** SAINT. (1) The apostle of the Franks (437-c.533). He was born of noble family at Leon. He was appointed in 459, against his will, to the Bishopric of Rheims, and his episcopate is memorable for the conversion

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of Clovis, who was baptized by Remy on December 24, 496. Remy lived to see Gaul almost entirely Christianized, and died in 532 or 533. Some of his letters are preserved in Migne, *Patrologia Latina*, lxv., as also two documents under the title of *Testamenta*, the genuineness of which has been disputed. Consult his *Life*, by Aubert (Paris, 1849). (2) An Archbishop of Lyons (853-875), who sided with Gottschalk (q.v.) and whose works are in Migne, *Patrologia Latina*, cxxi. (3) A Benedictine monk, head of the episcopal school at Rheims (882-908), whose works, which are commentaries and an allegorical interpretation of the mass, are in Migne, *Patrologia Latina*, cxxxi.

RENAISSANCE, rē-nā-sōns', or rē-nā'sâns (Fr., new birth), or REVIVAL OF LEARNING. A name usually applied to the transition from mediæval to modern methods of study and thought. As to its origin and the time at which this is to be set, literature is full of misinformation. A common error, still repeated in text-books, is that through the capture of Constantinople by the Turks in 1453 Greek manuscripts and Greek scholars were brought into Europe in such numbers that a complete revolution in the intellectual life was thereby and at once produced. This notion takes no account of the condition of European culture which must have existed to make such a reception possible. In fact, the revival of interest in learning for its own sake followed a long and natural process. It is clearly discernible more than a century before the capture of Constantinople, and by that time had completely established itself in Italy and made great progress in other countries. The actual importation of manuscripts and teachers, doubtless stimulated by this event, had long been going on, and it had already become an established custom for Western youths to seek in Athens or in Constantinople satisfaction for the intellectual curiosity aroused by their studies at home.

It is again a popular error to suppose that we can reach a clear understanding of the great transition by undervaluing the culture of the Middle Ages. The difference is not merely or primarily in the mental power of individuals nor in the volume or range of their learning. It is in the spirit in which they approached the study of the past and applied it to the conditions of the present. Mediæval learning had been pursued almost entirely by clergymen and had been valued chiefly for its service in making clear to the increasing mental acuteness of the West the mysteries of the faith. During this period the European mind had lain under the spell of the philosophy of Realism, with its inevitable indifference to the phenomena of everyday experience and its contempt for the idea of the individual as compared with the authority of traditional institutions. With the beginning of the fourteenth century a reaction makes itself clearly felt. A new philosophy, that of Nominalism, finds expression in the Englishman William of Ockham and becomes a vital force in the political theories of Marsiglio of Padua and his school. The essence of this new way of looking at things is the importance of the individual, and hence his right to think and organize as may seem best to him. In religious affairs we see the application of this principle in the fearless criticism of the prevailing conditions by Wiclif in England, Huss in Bohemia, and all their sympathizers, organized or not, throughout Europe. This central idea is that the most important fact of Christianity is the membership of the individual Christian in a community of which Christ alone is the head, and that consequently all organized forms of human authority in religion are nonessential and may be totally wrong. The only necessary authority is that of Scripture, and the inevitable result of this is the right of individual interpretation with all its consequences. From Wiclif on through the whole period of the Reformation, the Bible is the common source of appeal for the most diverse forms of opposition to the Roman system. Naturally men found in its infinite variety a thousand serviceable things that were not there.

Precisely parallel with this development in religion is the intellectual process we call the Revival of Learning. Wiclif's Italian contemporary Petrarca subjected to a sweeping criticism all the existing forms of the science of his day: the scholastic philosophy, the science of astrology, the study of the law and of medicine, the practice of teaching, all seemed to him to be governed by a set of conventional rules having no foundation in fact. To this mass of tradition Petrarca opposed the principle of individual study and observation of things as they were. Yet, he, too, like the religious reformers, must have his authority, and he found it in the classic literature. The 'ancients' stood to him for types of a higher manhood, with larger, freer, and truer conceptions of life. They seemed to him free from the superstitious slavery to traditions which he saw around him. His own struggling individualism found its justification in what he imagined to be the perfected individualism of the ancient world. His own poetic gift found its chief satisfaction in the poetic charm of ancient literature; even the prose of Cicero seemed to him to have a wonderful rhythm long before he could understand it. Then, precisely as the religious reformers insisted that the Bible should be studied without restraint of doctrine or tradition, so Petrarca found his chief mission in collecting, collating, copying, and publishing the texts of the classical authors. Still further, as the translations of Wiclif and others were made, not from the original tongues, but from the imperfect Latin authorized version (Vulgate), so Petrarca had to be content with Latin versions of the Greek authors. In both cases the authority they reverenced came to men in an imperfect form, but in both the spirit of a new time is perfectly evident. Wiclif is the first apostle of the Protestant Reformation, and Petrarca is the first great teacher of the Revival of Learning. To conclude, the Humanist was as much inclined to discover non-existent things in his classics as was ever the Reformer in his Bible.

Petrarca was at once the defender of rational thought, and, after Dante, the chief creator of the modern Italian language. The literary use of the modern tongues, the natural utterance of the free layman, is, equally with the more sympathetic study of the ancient world, an element in the great reaction against a purely clerical and Latinized culture.

This double intellectual life of Petrarca is shared by all his humanistic contemporaries and

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immediate followers. Giovanni Boccaccio is known to posterity chiefly through his Italian prose tales, but his own special pride was in the service he rendered to classical learning by his laborious encyclopædic works—the *Genealogy of the Gods*, a dictionary of mythology, and his *Dictionary of Classical Geography*. These books served as a groundwork of classical studies for the youth of two centuries to come. Boccaccio died as professor of the *Divine Comedy* at the University of Florence, another illustration of the equality of the modern and ancient literatures in the estimation of Renaissance Italy.

Petrarca applied to learning for the first time what we have learned to call the 'collector's instinct.' Much of the classic literature was already known, but until Petrarca no one had thought of searching for more. Through his widely extended personal relations in all the countries of Europe he was able to employ willing hands to bring the long-forgotten manuscripts out of their hiding-places, to have them sent to him, procure copies of them, compare these with the originals, and thus learn wherein they needed correction. Many indications in already known writings pointed to others not yet discovered, and thus made possible intelligent search after these lost treasures. All this work was carried on by Petrarca and his contemporaries with the fresh enthusiasm that belongs only to an interest freed from any professional quality, but it soon became the serious pursuit of men who gave their lives to it, and thus laid the foundations for a new profession, unknown to the Middle Ages, the profession of the scholar, pure and simple. These men were devoted to learning for its own sake, and ready to leave to others the application to practical things.

The same instinct of discovery appears also in the field of archæology. The Middle Ages had pitilessly despoiled the remains of ancient buildings to gain material for their own constructions, and had destroyed without scruple the choicest works of antique sculpture. Now, following the indications of what remained above ground, Petrarca and his followers began to seek for what was hidden. They gave the first feeble impulse to the vast activities of modern research. To them we owe the beginnings of both the libraries and the museums of modern Europe.

In the generation following Petrarca the influence of the new learning makes itself widely felt in many forms of activity. Men whose early training had been chiefly as scholars came to be sought for services of every kind. Coluccio Salutato, one of Petrarca's most ardent admirers and imitators, spent his life as secretary of the Republic of Florence, at a time when the little State was involved in the most complicated relations with all the powers of Europe. It was his duty to write the elaborate Latin essays which were then the chief medium of diplomacy, and his fame rests upon the elegance and purity of this imitated classicism. Poggio Bracciolini filled for life a similar place in the Papal chancery, and was no less approved and applauded because his caustic humor reveled in ribald obscenities. Niccolò Niccoli was the business centre of the Florentine group of scholars, the earliest type of the modern book-collector and publisher. Ambrogio Traversari, general of the Order of Camaldoli, devoted much time to studying and editing the works of the ancients. Francesco Filelfo was the earliest specimen of the haughty pedant, learned beyond others in all the detail of scholarship, but without the creative power that had marked the pioneers. He touched the schoolmasterly stage of the Revival when the work of discovery had largely been done, and when the chief distinction of the scholar was to be gained by a kind of technical skill quite independent of any largeness of mental equipment.

It is at this stage that we begin to see the results of the great expansion of interest due to the study of Greek. Petrarca had deeply felt the importance of this study, and had bemoaned his incapacity to engage in it. Greek was still a living tongue in parts of Southern Italy, and communication with the East was frequent enough, but Boccaccio, who seems really to have made the effort, found it impossible to procure suitable instruction. The men of the next generation, however, set themselves more earnestly to work; Greek teachers began to hear of the golden opportunities in the rich Italian towns, and Italian youths sought instruction at the ancient school of Athens. The earliest and most influential of these Greek teachers was Manuel Chrysoloras, a man of distinction in the public service at Constantinople, brought over to Italy by his duties in this capacity, and then employed as teacher of Greek at Florence. He died on his way to attend the Council of Constance in 1415. Another Greek of later influence was John Argyropulos (died c.1489), who was successively rector of Padua and professor at Florence and finally at Rome. Of Italians who illustrated the highest application of ancient culture to the development both of Italian literature and the perfection of classic learning, we may mention Guarino (d.1460), Poliziano (d.1494), and Lorenzo de' Medici (d.1492). The inherent charm of the Greek language and literature worked at once upon the highly sensitive Italian mind, revealing a new world of beauty and of meaning.

Circumstances favored a rapid spread of the new culture. The Italian cities, grown rich under democracy, but having tired somewhat of its responsibilities, had been passing into the control of that extraordinary series of despotic rulers who united with a brutal unscrupulousness of character a taste for the best in literature and art without a parallel. It was one of the chief claims to power for a new-made tyrant like Cosimo de' Medici that he provided the means of existence for talent of every sort. Even the bloody ruffians who, one after another, held power in Milan, made places for scholars and artists, maintained libraries, and encouraged learned research. The ancient universities of Bologna, Padua, and Salerno were reinvigorated by the healthful breath of the new learning and stimulated by the rivalry of the new schools founded by the younger republics. The Papacy, with a free hand after the Council of Basel (1431-49), passed into the control of a series of men like Nicholas V., Pius II., and Leo X., in whom the interest in learning and art was an absorbing passion. In fact, learning, under the Italian humanistic impulse, may be said to have taken on the form of a fine art and thus to have concealed much of its serious import. Under all these favoring conditions it is not strange that a certain flippancy of character

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came to be associated with the cleverness of the fifteenth-century scholars. The lightness of Boccaccio had seemed the natural expression of exuberant joy in the natural things of human life. A century later this sincerity had largely given way to an over-refinement that knew no limits. Everything was permissible in the name of æsthetic experiment. Without in any formal way renouncing their allegiance to Christianity, many became more really interested in philosophy than in doctrine, and became increasingly lax in following the ordinary forms of devotion.

It is here that we may best notice a distinction insisted upon by recent Roman Catholic scholars —notably by Ludwig Pastor in his *History of the Popes*—between a 'true' and a 'false' Renaissance. By the former is meant the enlargement of scope and the clearing of the mental vision possible to men without departure from the traditions or the institutions of the Church. By a 'false' Renaissance is meant the exaggeration of the æsthetic and critical side of learning to a point where it must lead to indifference or even hostility to the clerical traditions.

A great change came over the spirit of the New Learning when it passed to the more serious, less artistic, and more deeply religious peoples of the North. The impulse which led young Germans and especially young Englishmen to cross the Alps and study the ancient classics under Italian teachers was largely the desire to find the very best means to acquire such training as would help them in the regular professions. There is in the North but little of the affected æstheticism of the later Italians. Such men as those whom Erasmus found in England at the end of the fifteenth century, John Colet, later Dean of Saint Paul's, founder of the most important boys' school in England and interpreter of Christianity by the method of a rational criticism; Grocyn, the most important agent in introducing the teaching of Greek into England; Thomas Linacre, founder of the London College of Physicians; and Thomas More, a busy lawyer, King's counselor, and social reformer, suggest a type of man totally different from the members of the Florentine 'Academy.' Yet all these men drew their intellectual inspiration from Italy, and were free to acknowledge their debt. Erasmus himself, with all his biting satire and his ready criticism of many serious things, was primarily the preacher of a sane rationalism based upon sound learning, and by this he always meant the learning of the New Method. 'Art for art's sake' never held the same place in the intellectual code of the North as in that of Italy, but the appreciation of learning was there none the less keen, and proved to be more lasting in its effect upon national character. One of the great services of the northern Humanism was the revival of the study of Hebrew on a scientific basis. What we have said of the mediæval study of Latin applies equally to that of Hebrew. It had been pursued by Jewish scholars with a view to the perpetuation of their racial institutions, but it had not been in any sense an instrument of culture. Johann Reuchlin, an elder contemporary of Luther and Erasmus, was the first to call attention to the importance of Hebrew in a complete scheme of Christian scholarship. He aroused a storm of opposition from the same obscurantist elements that had always been ready to persecute Jews as inevitably hostile to all that bore the Christian name. He found his support wholly in the circle of enlightenment that had spread itself outward from the study of the Greek and Latin classics as a means of civilization. The party of the 'Reuchlinists' included all the forward-looking elements of German society and attracted the sympathy of the men of enlightenment everywhere. Its most characteristic expression is found in the *Epistola Obscurorum Virorum* (Letters of the Men of Darkness), the most galling satire of the Reformation period, in which the old scholastic method was held up to the derision of people who were quite ready to join in the laugh and to carry out the suggestion of reform.

The first quarter of the sixteenth century saw the capture of most of the great universities of the North by the new spirit. Even at Paris the theological school, the Sorbonne, still defended the ancient faith, and largely by the ancient methods, while the Collège de France founded by Francis I., became a seat of enlightened instruction. So at Louvain, one of the most solid bulwarks of the scholastic theology a new school, established with the help of Erasmus, kept up the balance with success.

The great importance of the New Learning in its effect upon the Protestant Reformation is sufficiently shown by the studies of Luther, Calvin, Zwingli, and other leaders of the movement. No doubt the immediate effect of the Reformation was once more to turn men's minds away from purely æsthetic considerations, but the work of the New Learning had been done and could not be undone.

BIBLIOGRAPHY. The most important work on the general history of the Renaissance is Voigt, *Die Wiederbelebung des klassischen Altertums* (3d ed., Berlin, 1893). Consult also: Müntz, *Precursori e propugnatori del rinascimento* (Florence, 1902); Burckhardt, *Geschichte der Renaissance in Italien* (Stuttgart, 1890-91); id., *Kultur der Renaissance in Italien* (8th ed., Leipzig, 1901); Symonds, *The Renaissance in Italy* (London, 1877); Pater, *Studies in the History of the Renaissance* (ib., 1873); Biese, *Die Entwicklung des Naturgefühls im Mittelalter und der Neuzeit* (Leipzig, 1887); Robinson and Rolfe, *Petrarch* (New York, 1892); Seebohm, *The Oxford Reformers* (3d ed., London, 1887); and the lives of Erasmus by Froude (ib., 1894), Drummond (ib., 1873), and Emerton (New York, 1899).

RENAISSANCE ART (OF., Fr. *renaissance*, from Lat. *renascens*, pres. part. of *renasci*, to be born again, from *re-*, back again, anew + *nasci*, to be born). During the last decades of the fourteenth century and the first decades of the fifteenth a new spirit invaded the domain of art, asserting itself in a new enthusiasm for the study of man and the study of the antique. To the humanists in literature corresponded the realists, naturalists, and classicists in art. Antique art was not discovered, but while the classical element preponderated in architecture and decoration, it was the element of realism that took possession of the arts of sculpture and painting. The flowering of the Renaissance into these new impulses was chiefly due to a few leading artists of Tuscany between 1390 and 1430; to the architects Brunelleschi, the sculptors Donatello, Quercia, and Ghiberti, and the painters Masolino, Masaccio, and others. Northern critics, however, have

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shown that a strongly realistic school had previously developed in Burgundy, Northern France, and Flanders, especially in the sculpture of such artists as Claux Sluter, Beauneveu, and Jean de Cambrai. The age of the Renaissance, though it practically closes before 1600, was not superseded by a Græco-classical revival until about the period of the French Revolution.

Painting was the typical art of the Renaissance because it best expressed its realism. In architecture the style was far less original, its character being less constructive than decorative. The preponderance of the secular spirit led to a decadence of religious art in all forms. The previous tendency toward general types in art gave way before a new individualistic tendency, each artist creating his own personal style. Only in painting were the peculiarities of local schools very prominent.

Tuscany was followed by Lombardy in the development of the Renaissance about 1460, and shortly afterwards by Venice. Rome and Naples were simply meeting places for Tuscan and Lombard artists. France was the first foreign country to follow the example of Italy, with whom its relations of all kinds had long been of the closest. Spain, in some parts, then followed quite early in the sixteenth century. Not till the middle of the century did Germany and England accept the new style to any large extent, and even then with less of pure beauty and classic precision than in Italy and France.

Renaissance sculpture and painting are of such importance in the history of the general development of these arts that it is most convenient to treat them under the general articles.

ARCHITECTURE—ITALY. Gothic architecture had never acquired a deep-rooted hold in Italy and Italian architects had been seeking for a new style ever since the decline of the Romanesque. This they found in a study of the Roman ruins, out of whose columns, entablatures, and arches they developed a style which, sharing the pagan spirit of Roman art, was more successful in secular than in religious buildings. Coming at a time of individualism, it developed personal and local phases of style, and its history is the history of the works of individuals, not of a national style. It developed into a system of decoration and composition rather than of construction, although it made effective use of the dome and vault. Several periods of Italian Renaissance can be distinguished: (1) Early or Free Renaissance, c. 1420-1500; (2) High or Classic Renaissance, c. 1500-1580; (3) the Decline of Barocco, c.1580-1780. The founder of the style was the Florentine Brunelleschi, the greatest designer of the early Renaissance and equaled only by Michelangelo and Bramante among later men. In the Pazzi Chapel (1425) and the two great basilican churches of Santo Spirito and San Lorenzo he revived the moldings and details of classic architecture, but neither he nor his followers, Michelozzi and Giuliano da Majano, attempted any close imitation of Roman buildings. The two great palaces of this first period in Florence, viz. the Riccardi by Michelozzi (1430) and the Pitti (1435), though Roman in scale and in minor details, were of a thoroughly modern and Florentine type. Alberti was the first to attempt strictly Roman and classic exterior design in both religious and secular architecture by the use of superposed orders, pilasters, entablatures, and Roman arches. Florentine architects of later date, Rossellino and Francesco di Giorgio, carried the new style to Pienza, Siena, and Cortona, and others, like the Majani, Laurana, and Giuliano di San Gallo, to Naples, Urbino, and Rome. The ducal palace at Urbino is one of the most imposing masterpieces of the Early Renaissance. In Lombardy the new style developed a prolific school of design which, retaining the use of terra-cotta ornament, open arcades, and some mediæval details, was more varied and picturesque than the Florentine. Its influence was carried to Venice by the Lombards, and there gave rise to the most richly decorative of all the local Renaissance styles, through the free use of marble incrustations and surface carving. To Lombardy belongs also the most highly decorated façade of the Renaissance, that of the Certosa at Pavia; and from Lombardy came Bramante, the genius who inaugurated the Middle Renaissance, after his establishment in Rome in 1499.

While most of his predecessors had been primarily goldsmiths or decorators, Bramante was a master-builder, and became an architect in the true modern sense. He was the first to embody the genuine Roman spirit in modern design, as in his Tempietto, and in his designs for the Vatican and Saint Peter's (1503-06). Henceforth both the Lombard and early Tuscan systems of ornament were abandoned for plain surfaces and colossal details; the new style was severe and grandiose; only in the interiors was decoration still abundant. The design that embodied its best features was Bramante's plan for Saint Peter's. The Roman school under him now succeeded the Tuscan in the leadership, and the study of Vitruvius and the measuring and drawing of Roman ruins became an accepted part of every architect's training. Raphael, Peruzzi, and Antonio da San Gallo were among Bramante's foremost pupils; the Farnesina, Massini, and Farnese palaces embody their ideas, the last named being the most imposing in Rome. But meanwhile the Venetian school had not lost the individual charm (see VENICE) of its civic and palace architecture under Guglielmo Bergamasco and his rivals and then under the neo-classic leader Sansovino, whose Libreria di San Marco and Palazzo Comaro marked an epoch in Venetian architecture.

This middle period closes with Michelangelo, whose genius, like Bramante's, also ushered in a new period, that of the scientifically developed Renaissance, based upon the deepest study of classical monuments. Remodeled by Michelangelo, Saint Peter's remained even more the type for Renaissance churches. The dome, either single or grouped, the tunnel vault and cross vault, often coffered, continued the orthodox forms of covering. Internal piers became heavier, while columns often took the place of pilasters outside. The single order after the colossal example of it given at Saint Peter's by Michelangelo reigned supreme. Vignola's works present this style under a more refined aspect and mark the beginning of the villa architecture of the Roman school. (See LANTE, VILLA.) In the palaces of Alessi and others at Genoa monumental staircases and vestibules are the central point for grandiose and original treatment, rather than the façades. The progressive domination of classic formulæ is observed alike in the writings and

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the buildings (especially at Vicenza) of Palladio. The term Palladian is generally used for this scientific-theoretical style, whose side lights were Vignola, Serlio, and Scamozzi. Its first great embodiment in Palladio's work was the arcade around the basilica at Vicenza, which was followed by other remarkable works, such as the Palazzo Chieregati, the Palazzo Tiene, and the Teatro Olimpico. He created his highest types of religious architecture in Venice with San Giorgio Maggiore and the Redentore, and through them produced a revolution.

Hard on his footsteps came the Barocco style (q.v.) (c.1575-1780). It was a reaction from Palladian severity and reveled in broken lines, vagaries of proportions and form, defiance of tradition. Domenico Fontana, Maderna, Bernini, and Borromini were its greatest representatives. Its masters produced sometimes a grandiose work like Bernini's colonnades of Saint Peter or a logical church façade, though Maderna failed utterly in that of Saint Peter's and succeeded better only in smaller buildings such as Santa Susanna. The works of Longhena (q.v.) at Venice were exceptions to the general rule of extravagance and bad taste. As in every final style of an architectural period, the picturesque predominated over the monumental. Rich colored marbles, heavy details of cupids, scrollwork, and architectural motives, even imitations in metal and marble of stuffs, as in Bernini's famous baldachin, are prominent.

FRANCE. The close political relations of Italy with France and the habit of calling in Italian artists, consequent upon the campaigns in Italy of Charles VIII., Louis XII., and Francis I., led to the introduction of Renaissance forms into France sooner than elsewhere; at the same time the strength of French Gothic traditions not only retarded the prevalence of Renaissance forms, but led to an internal reform rather than to the adoption of an Italian style. Religious architecture had been for some time on the wane and palace architecture in the ascendent. The first indications are most evident in decoration, where Lombard models prevail. The transitional period illustrated in the Château de Gaillon and in the older part of that of Blois (q.v.) is still prevailingly mediæval; but with Francis I. Gothic outlines tend to disappear and the classic orders to prevail. But it was not the foreign but the native artists to whom the fundamental changes were now due; first to the men of North France, like Fain and Biart; then to those of the Royal Domain, like Le Breton and Lemercier, while others, like Chambige in his unique Château of Saint Germain, remain outside of the Renaissance orbit even toward the middle of the seventeenth century. The greatest achievement was the transformation of the feudal castle into a superb and artistic residence, totally unlike anything known in Italy: such were Amboise, Blois (q.v.), Fontainebleau (q.v.), and especially Chambord (q.v.), with its great corner bastions and its forest of dormer windows, chimneys, and towers, a characteristic feature in which French differs so fundamentally from Italian Renaissance. These royal residences were almost rivaled by those of the nobility like Azay-le-Rideau and Chenonceaux (q.v.).

The closing years of Francis I. (died 1547) usher in a more classic style. Some of its leaders, like Jean Bullant, Du Cerceau, and Philibert de l'Orme, studied in Italy; others, like Pierre Lescot, were undoubtedly familiar, through drawings, with Italian buildings. Lescot's creation of the Louvre (q.v.) (1546) is the classical example of the new style of royal palace without a trace of mediævalism, and is if anything superior to the contemporary work of San Gallo, Vignola, and Sansovino in Italy. One of its great charms lies in the magnificent sculptures of Jean Goujon and others, which make it unique in its decorative scheme. De l'Orme's Tuileries (q.v.) and Château of Anet were his masterpieces. Under Francis I., Henry II., and Charles IX. France was covered, especially in the region of the Loire, with châteaux of similar types, with civic structures like the town halls of Beaugency and Paris, and with innumerable city houses of the nobility and bourgeoisie. The changes brought about by a further influx of Italian ideas under Maria de' Medici involved loss of charm as well as force in later works. Additions were made to the royal palaces such as the Tuileries, the Louvre, and Fontainebleau and a new palace, the Luxembourg (q.v.), was built by one of the leaders of the new school, Salomon de Brosse, who improved upon his Italian model, the Pitti Palace. Lemercier was very successful in his additions to the Louvre and in the Sorbonne. Through all this middle period there is a constant struggle between Italian classic and barocco tendencies and the French love of the picturesque, but French architects did not go to the extreme either of scientific frigidity or lawless eccentricity.

Under Louis XIV. a more fanciful decoration mingled with the formal Palladian architecture. Mansart showed in his colossal palace of Versailles the chilling effects of this formal classicism, but he achieved greater success in his dome of the Invalides. The masterpiece of the time was, however, the superb Corinthian colonnade of the east front of the Louvre, by which the palace was completed, from the designs of Perrault. The interior decorative work of this period in France has an originality and delicacy that places it as much above contemporary work in Italy as the early decoration had been inferior. Under Louis XV. Italian ideas obtained complete possession of exterior design and of church architecture both exterior and interior, though in domestic architecture the interior decoration and furniture display a remarkable fantastic originality. The Paris Pantheon by Soufflot (q.v.) represents the formal Roman classicism that prevailed in the latter part of the eighteenth century.

GERMANY. The Renaissance as a style in art and especially in architecture made its way more slowly in Germany than elsewhere, except in England; partly, no doubt, because the movement was so largely concerned with religious questions. When the new style entered Germany it was from Carinthia, Bohemia, and Tyrol, rather than from Italy, and Italian architects were employed in Prague, Cracow, Gran, and Vienna, long before the creation of the earliest examples of the style even in South Germany, while the northern States were still slower in receiving it. The real transformation of German architecture began after the Peace of Augsburg (1555), and is to be seen in the castles of the princes and barons, the houses of wealthy burghers, and guilds, and the *Rathäuser* of the town

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councils, rather than in royal palaces or in religious buildings. Indeed, Saint Michael's, Munich, is the only really important church edifice of the sixteenth century in all Germany (1582). Until the Palladian or rather the Italian Baroque style invaded Germany, late in the seventeenth century, the Germans retained in their Renaissance buildings unchanged many of their national and mediæval features—high roofs, vast stepped gables of fanciful outline, dormers running through two or three stories, spiral stair-towers, oriels, the irregular plans of the feudal castles, and a predilection for old, fantastic, and picturesque combinations of form and detail. The orders appear rarely except in portals or in pilasters, and then treated with utter disregard of classic canons, and court arcades of the classic type are not to be found, the Germans preferring stumpy columns with segmental arches to the Italian type. The style appears, therefore, at its best in the smaller street fronts of narrow houses, or the picturesque masses of castles on the hillsides, as at Torgau, or in the highly ornate Otto Heinrichsbau (1554) and Friedrichsbau (1601) of the great castle at Heidelberg, which are generally considered the masterpieces of the first period. The town halls of Altenburg, Danzig, Augsburg, Rothenburg, and Bremen (from 1562 to 1612) and others of less importance form another interesting group of examples of the style. In the later or Baroque period there were many palaces erected or enlarged of moderate architectural interest, except in the case of the Zwinger at Dresden (1711), which is one of the finest and most consistent examples of the Rococo extant; and there were also a number of interesting churches in this style (e.g. Marienkirche at Dresden). Landscape architecture after the style of Versailles was highly developed in this period.

Belgium and Holland. In these closely related countries Renaissance architecture developed very differently, though late in both. Belgium was strongly affected by both French and Spanish influences, as in the fantastic semi-Spanish episcopal palace at Liège by Borset (1508), and produced but one monumental edifice of classic type, the Antwerp town hall (1564). As in Germany, many of the most characteristic Renaissance works are guild halls and narrow street fronts, as on the great square at Brussels, the Boatmen's houses at Ghent, etc. Even more successful were many sumptuous choir screens, altars, and pulpits, both in Belgium and Holland. In the latter country the Renaissance produced almost no works of real importance, though some of the Dutch town halls are worthy of notice, as at The Hague (1565), Amsterdam (1655), and Leyden (1597). With these may be classed also the Amsterdam Bourse, and in Denmark the Exchange at Copenhagen. The use of brick, of stepped gables, and of a simple and *naïf* style of design gives a certain charm to many less important Dutch buildings.

Spain. Although the Renaissance in architecture entered Spain largely through the work of Flemish artists, it developed more rapidly and produced more important works than in Flanders. The exuberant decorative spirit of Spanish late Gothic and Moresque art appears in the elegant detail of the Plateresque, as the early phase of the Renaissance in Spain is called, in such structures as the Santa Cruz Hospital at Toledo, the College at Alcalá de Henares, and the Ayuntamiento at Seville, all between 1500 and 1520. About 1525 church architecture was radically modified by the new style, as shown in the cathedrals of Jaén (1525) and Granada (1529) and San Domingo at Salamanca. But hardly had this begun when Berruguete returned from Italy and brought with him the High Renaissance in the Palladian form, which was further developed by Herrera. This second phase of Spanish Renaissance is called the Greco-Roman, and it ruled until the close of the seventeenth century. The palace of Charles V. at Granada is a noble structure by Machuca and Berruguete, rusticated below, colonnaded above, of good proportions and well planned. One building especially corresponds in its vastness to the greatness and character of Spanish power, viz. the Escorial (q.v.), a huge rectangle, simple and uninteresting except in its domical church, which is an impressive edifice of classic style. In such works as these Italian ideas are reproduced with greater fidelity and absence of local national traits than in any other country. On the other hand, when under the leadership of Churriguera an extreme form of Baroque or Rococo pervaded Spain, the national leaning toward elaborate detail and over-decoration of surfaces ran riot as never before. Some of the royal palaces (Madrid and San Ildefonso) built in the eighteenth century escape it, but with few exceptions it prevailed.

Portugal hardly holds any independent position. Its masterpiece of the sixteenth century, the group of monuments at Belem, is the *comble* of luxuriant expression of the mixed late Gothic and pseudo-Renaissance design.

England. Latest of all countries to employ the Renaissance style was England. Under Elizabeth and James I. (1558-1625) there were sporadic examples and a sprinkling of the new style of decoration in Tudor work. There were some Italian artists like Torrigiano and Giovanni of Padua, but they had to adapt themselves to Tudor requirements, except in a few cases such as the Caius Gate at Cambridge. Inigo Jones changed the trend of architecture and led to the universal adoption of the pure Italian High Renaissance of the Palladian type before the middle of the seventeenth century, his happiest effort being the palace at Whitehall (q.v.). His work was carried forward by Wren, whose masterpiece, Saint Paul's Cathedral (q.v.), is one of the great buildings of Europe. It combined the Renaissance groups of domes with the typical ground plan of an English Gothic cathedral. Wren's sobriety and consistency gave a character of good taste to all contemporary English architecture, which continued throughout the eighteenth century under the leadership of men like Van Brugh, the designer of Blenheim, Hawksmoor, and Gibbs, who built Saint Martins-in-the-Fields and the Radcliffe Library, Oxford. These men and their successors, Chambers, Adams, Taylor, and Dance, show a progressive degeneration in point of originality up to the close of the century, when the wave of purely Greek Renaissance struck England and was embodied in buildings like the Bank of England (see Soane), the British Museum (q.v.), the Fitzwilliam Museum, Cambridge, and the fine Saint George's Hall, Liverpool (q.v.).

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books of reference are: Burckhardt, *Der Cicerone* (7th edition, by Bode, Leipzig, 1898); id., *The Civilization of the Renaissance in Italy*, trans. by Middlemas (London, 1890); Müntz, *Histoire de l'art pendant la renaissance* (Paris, 1894). Consult also: Pater, *The Renaissance* (London, 1873); Symonds, *Renaissance in Italy. The Fine Arts* (ib., 1877); Vernon Lee, *Euphorion* (ib., 1884); Scott, *The Renaissance of Art in Italy* (ib., 1888); Hoppin, *The Early Renaissance and Other Essays on Art Subjects* (Boston, 1892); Philippi, *Die Kunst der Renaissance in Italien* (Leipzig, 1897); Woelfflin, *Die plastische Kunst: eine Einführung in die italienische Renaissance* (Munich, 1899); and on the architecture, Anderson, *Architecture of the Renaissance* (London, 1896). For a detailed account of the Renaissance in France, the best works are: Berty, *La renaissance monumentale en France* (Paris, 1864); Pattison, *The Renaissance of the Fine Arts in France* (London, 1879); Chateau, *Histoire et caractères de l'architecture en France* (Paris, 1864); Palustre, *La Renaissance en France* (ib., 1879-89); id., *L'architecture de la Renaissance* (ib., 1892); Lübke, *Geschichte der Renaissance in Frankreich* (Stuttgart, 1886). For Germany, consult: Fritsch (ed.), *Denkmäler der deutschen Renaissance* (Berlin, 1882 et seq.), which has plates; Lübke, *Geschichte der Renaissance in Deutschland* (Stuttgart, 1882). Other works on Renaissance architecture are: Eastlake, *History of the Revival of Architecture* (London, 1871); Smith and Poynter, *Gothic and Renaissance Architecture* (ib., 1880); Gotch and Brown, *Architecture of the Renaissance in England* (ib., 1897); Jäschke, *Die Antike in der bildenden Kunst der Renaissance* (Strassburg, 1900). Consult also the articles on the principal artists referred to in the text.

RENAIX, re-nâ'. A town of Belgium, in the Province of East Flanders, picturesquely situated, 24 miles by railway south of Ghent (Map: Belgium, B 4). It manufactures principally fine linen and damasks, woolen fabrics, tobacco, and pottery. Population, in 1900, 20,090.

RENAL DISEASE. See BRIGHT'S DISEASE; CIRRHOSIS.

RENAN, re-nän', ERNEST (1823-92). A French religious historian and Semitic philologist, born at Tréguier, in Brittany, February 27, 1823. Of his childhood he told in *Souvenirs d'enfance* (1883). He lost his father in youth and owed it to a devoted sister that he could begin with neighboring priests the studies for which his frail health seemed to designate him. He was soon summoned to Paris and promoted to Saint-Sulpice, the chief training school of the French priesthood. His belief in the Catholic teaching soon began to leave him, but not his love for its beauty, nor his regard for its worthy professors. At twenty-two he abandoned his study for orders and taught Latin in a clerical school, still aided by his sister's savings, till at twenty-five he won his doctorate with such distinction as to assure a position that was already recognized by an academic prize for an essay *Sur les langues sémitiques*. He won a second prize in 1850 for an essay *Sur l'étude du grec dans l'occident au moyen-âge*, was sent by the Academy to Italy, where he prepared an epoch-making work on Arab philosophy, *Averroès et l'Averroisme* (1852), and to Syria (1860), where he found inspiration for his *Vie de Jésus* (1863), the first of seven volumes that occupied him from 1867 to 1881, dealing with the origins of Christianity to the death of Marcus Aurelius. To this he added as an introduction *L'histoire du peuple d'Israël* (1888-94). Though elected professor of Hebrew in the Collège de France (1862), he was not allowed to lecture, because of his expressed unorthodoxy. This gave wide popularity to his ideas and allowed him more leisure to propagate his enthusiastic belief that politics, education, and ethics itself would be regenerated by the progress of science, especially of history and philology. The *Vie de Jésus* was widely translated; 300,000 copies were sold in France alone, and for every later work of Renan there was a popular as well as a scholarly demand. *Les apôtres* (1866) and *Saint Paul* (1869) were followed by a volume of essays on contemporary questions (1868). Then came the Franco-German war, which evoked from Renan two remarkable letters to David Strauss, the radical biblical critic of Tübingen, showing a patriotism free from every taint of Chauvinism. The Republic restored his professorship and he now published *L'Antéchrist* (1873), *Les évangiles et la seconde génération chrétienne* (1877), *L'église chrétienne* (1879), *Marc-Aurèle et la fin du monde antique* (1881). Volumes of essays with the titles *Etudes* (1857), *Essais* (1859), *Mélanges* (1878), *Nouvelles études* (1884), *Discours* (1887), accompanied or followed his more connected work. His *Drames philosophiques* were first collected in 1888. A vision of *L'avenir de la science*, written in 1848, was given to the world as a sort of parting gift in 1890. During his last years Renan enjoyed all the honors, public and private, that Paris could give to a favorite scholar. He was made grand officer of the Legion of Honor and administrator of the Collège de France, dying as he had wished, at his post, October 2, 1892. Renan saw so many sides of his subject that he was never as sure of any of them as he was of his own critical wit. He was by turns hazy, cautious, mythical, ironic, idealistic, skeptic, all with a romantic sentiment and a rosy optimism that regarded the nineteenth as "the most amusing of centuries," to be contemplated with "benevolent and universal irony." He had a lofty conception of moral duty, and held that "few persons have a right not to believe in Christianity." He knew that he himself was "a tissue of contradictions, one half fated to be employed in destroying the other," and he said this fact gave him "the keenest intellectual pleasure that man can enjoy." The clew to this psychic paradox is perhaps that Renan united two races, the Breton and the Norman, and two cultures, the ecclesiastical and the scientific, neither overcoming the other, and both possessing his mind. It is this, joined to a uniquely subtle, sensuous charm, that has made his influence a powerful one in the literature of the present generation. He typifies the skepticism of modern France, its awakening religious curiosity, its dilettante shrinking from 'the horrible mania of certainty,' its Protean inconsistency and its easy tolerance, born of a conviction that no faith is worth a struggle, much less a martyrdom. Of Renan's works there is no uniform edition. To the writings named above may be added many linguistic studies in the *Mémoires* of the Academy and in the *Journal Asiatique*, important con-

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tributions to the monumental *Histoire littéraire de la France* (vols. 24-30), translations of *Job* (1858), *The Song of Songs* (1860), *Ecclesiastes* (1881), and many lesser essays. The titles and dates of the *Philosophic Dramas* are *Caliban* (1878), *L'eau de jouvence* (1880), *Le prêtre de Némi* (1885), *1802, Dialogue des morts* (1886), *L'abbesse de Jouarre* (1887). There are English translations of the whole *Histoire du peuple d'Israël* and of the *Origines du christianisme*, of the *Etudes* and *Nouvelles études*, of *Job* and the *Song of Songs*, and of the *Souvenirs*. For Renan's life and character consult his own *Souvenirs d'enfance et de jeunesse* (1833), his *Feuilles détachées* (1892), and *Lettres intimes* (1896); also the monographs by Bourget, in *Essais de psychologie contemporaine* (Paris, 1883); Reinach (ib., 1893); Abbé d'Hulst (ib., 1894); Séailles (ib., 1895); and Mountstuart Duff (London, 1893); also Lemaitre, *Les contemporains* (Paris, 1890-92); and Monod, *Les maîtres d'histoire* (ib., 1894).

His son ARY (1858—), born in Paris, became known as a landscape and figure painter and art-critic, and was a pupil of Delaunay and of Puvis de Chavannes. He began to exhibit in the Salon in 1880, contributed many critical essays to the *Gazette des Beaux-Arts*, of which he afterwards became secretary, and in 1900 published an interesting monograph on Gustave Moreau (q.v.).

RENDSBURG, rĕnts'bōōrk. A town in the Province of Schleswig-Holstein, Prussia, situated on the Eider and the Kaiser-Wilhelm Canal, about 15 miles south of Schleswig (Map: Germany, D 1). It has a thirteenth-century church, a gymnasium, a Realschule, and manufactures of woolens, pianos, fertilizers, meat products, leather, and artificial stone. It carries on a considerable trade in lumber and cattle. Rendsburg is first mentioned in the twelfth century. Population, in 1900, 14,757, chiefly Protestants.

RENÉ, re-nā', surnamed 'The Good' (1409-80). Count of Provence, Duke of Anjou and Lorraine, and titular King of Naples. He was born at Angers, January 16, 1409, being the second son of Louis II. of Anjou and Provence. He married Isabella of Lorraine and claimed the succession to the Duchy of Lorraine in 1431, after the death of his father-in-law, Duke Charles. Being opposed by another claimant, the Count of Vaudemont, René was defeated and taken prisoner, remaining a captive for several years. In 1434 he inherited Provence and Anjou on the death of his brother, Louis III. In 1437 he purchased his liberty and the possession of Lorraine by the payment of an immense sum. He now led an army into Italy to secure the Kingdom of Naples, the title to the succession to which had been left to him by Louis III., who had been adopted as her successor by Queen Joanna II., by whom René had been declared heir on the death of his brother. (See JOANNA II.) He had a powerful rival in Alfonso V. (q.v.), King of Aragon, who succeeded in capturing Naples in 1442. Weary of the vain struggle, René abandoned the kingdom and returned to Provence, where his Court at Aix became a famous resort for artists and poets. He sought to revive the poetry of old Provence, and his devotion to the forms of a rapidly disappearing chivalry gained him the name of the last of the Troubadours. Agriculture and manufactures were also encouraged and he earned his title of 'the Good.' He refused the crown of Aragon when offered to him, but allowed his son to accept it. His daughter, Margaret, married Henry VI. of England. After a long and prosperous rule, René died at Aix. He had no direct heirs and his possessions, therefore, reverted to the French Crown. For his literary productions see *Œuvres du roi René*, edited by Quatrebarbes (4 vols., Angers, 1844-46); and for his life, Leroy de la Marche, *Le roi René, sa vie et ses travaux* (Paris, 1875); Villeneuve-Bargemont, *Histoire de René d'Anjou, roi de Naples* (ib., 1825); Champollion-Figeac, *Les tournois du roi René* (ib., 1826).

RENÉE (re-nā') **OF FRANCE** (It. *Renata*) (1510-c.1574). A French princess, daughter of Louis XII., born at Blois, and married in 1527 to Ercole II., of the House of Este (q.v.), Duke of Ferrara. With him she differed greatly on religious matters, being a zealous patron of the Reformation, of Calvin, to whom she gave refuge in 1535, and of Bruccioli, who dedicated to her his version of the Bible in Italian. Ercole's Catholicism made his wife a subject for the Inquisition. She was imprisoned in 1554, confessed and attended mass, but after her liberation resumed her allegiance to Protestantism. After her husband's death (1559) she returned to France, and there attempted to unify the forces of Reform. Calvin wrote her many letters of counsel. Consult: Fontana, *Renata di Francia, duchessa di Ferrara* (Rome, 1888-93); and Rodocanachi, *Renée de France* (Paris, 1896).

RENEVIER, rĕn'vyā', EUGÈNE (1831—). A Swiss geologist, born and educated in Lausanne. There he became professor of geology, paleontology, and mineralogy in 1857, curator of the Vaudois Geological Museum in 1864, and a founder of the Swiss Geological Society and of the Paleontological Association (1874). Besides many important contributions to periodicals and work on the international geological chart of Europe, he wrote *Description des fossiles du terrain aptien* (1854-58, with Pictet); *Notices sur les Alpes vaudoises* (1864-79); *Carte géologique des Alpes vaudoises* (1875-77); *Orographie des Hautes Alpes* (3d ed. 1881); and *Chronographie géologique* (1896).

REN'FREW. A southwestern county of Scotland, bounded on the north and west by the River and Firth of Clyde, on the south by Ayrshire, and east and north by Lanarkshire (Map: Scotland, D 4). Area, 245 square miles. Renfrew is very uneven in its surface, and consequently in the nature and quality of its soil. At the Hill of Stake, on the Ayrshire border, the land rises to 1711 feet. Over two-thirds of the arable land is devoted to dairy farming. There are extensive mineral deposits in the county, and the exportation of coal, oil, and ironstone employs a large number of people. Chief towns, Renfrew, the capital, Greenock, Port Glasgow, and Paisley (qq.v.). Population, in 1801, 78,500; in 1851, 161,100; in 1891, 230,812; in 1901, 268,900.

RENFREW. A royal, Parliamentary, and municipal burgh, capital of Renfrewshire, Scotland, on the Clyde, six miles west-northwest of Glasgow (Map: Scotland, D 4). The Renfrew Grammar School and Blythswood Testimonial, originally endowed by charter of Robert III., is

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here. The inhabitants are employed in iron-works and in ship-building. Population, in 1901, 9297.

RENI, rā'nê, GUIDO (1575-1642). An Italian painter, one of the chief masters of the Eclectic School (Bolognese). Born at Calvenzano, near Bologna, November 4, 1575, the son of a musician, he was apprenticed at an early age to Denys Calvaert. He then studied under the Carracci, especially under Lodovico, but aroused their jealousy, and soon parted company with them, and applied himself to the technique of fresco painting under Ferrantini. His first short visit to Rome in 1599, in company with Francesco Albani, a friend and fellow student, was given chiefly to the study of Raphael, and after some years of further study at Bologna of nature and of classic models, we find him again at Rome in 1605. His development was marked by works very dissimilar in style, those of his early years partaking of the manner of Caravaggio, as, for example, the "Crucifixion of Saint Peter" (1606, Vatican); the "Madonna della Pietà" (Pinacoteca, Bologna); and "The Hermits Saint Paul and Saint Anthony" (Berlin Museum). From this influence, however, he soon freed himself, forming a style of his own, tinged with refined idealism, in strong contrast to the coarse realism of Caravaggio, and exemplified by the "Concert of Angels" (1608), a charming fresco in the Chapel of Santa Silvia (San Gregorio, Rome), and the world-famed "Triumph of Phœbus," generally known as "Aurora" (1609, fresco in the Palazzo Rospiglioso, ib.)—his great masterpiece of this period, unequaled in nobility of line and poetry of color.

In 1610 Pope Paul V. commissioned Guido to decorate the chapel in the Quirinal and other private chapels, which works increased his reputation, as well as the number of his enemies, even the friendship of Albani turning into antagonism. After his return to Bologna in 1612, Guido painted "Saint Paul Reproaching Saint Peter" (Brera Gallery, Milan), quite Venetian in conception; the "Massacre of the Innocents" (Pinacoteca, Bologna), a work full of vigor and resplendent in that warm golden tone characteristic of the artist's middle period; the "Apotheosis of Saint Dominic," an imposing fresco in San Domenico, Bologna; and "Four Episodes from the Myth of Hercules" (Louvre). In 1620 he decorated a chapel in the cathedral at Ravenna, and in 1621 he went to Naples, commissioned to execute frescoes in the cathedral, but was compelled by the murderous jealousy of the Neapolitan painters to flee to Rome without accomplishing his task. Forced by intrigues to leave Rome, too, in 1622, he returned to Bologna, where he became the acknowledged head of the Eclectic School, and resided until his death, August 18, 1642. The tone of his pictures gradually changed to a pale silvery gray, and in the later part of his life his manner became slight and sketchy, his constant pecuniary difficulties, caused by his inveterate passion for gambling, inducing him to paint with careless haste to retrieve his heavy losses.

The most important works of the next decade were the "Triumph of Samson Over the Philistines" (Pinacoteca, Bologna), still in his purest golden tone; a "Judith" (Palazzo Adorno, Genoa); "Fortuna" (Accademia San Luca, Rome), one of his finest treatments of female form; and, above all, the "Rape of Helen" (c.1630, Louvre). Masterpieces in his silvery manner include the famous representations of "Saint Sebastian" (the finest in the Pinacoteca, Bologna; others in the Capitol, Rome, and in the Louvre), and the "Nativity" (Liechtenstein Gallery, Vienna, an unfinished replica in San Martino, Naples), pronounced by some authorities the artist's finest creation. Favorite subjects with him and his school were the "Ecce Homo," the most celebrated specimens of which are those in the Vienna (two), London, Bologna, and Dresden galleries; the "Cleopatra," best in the Madrid Museum and the Palazzo Pitti, Florence; and the "Penitent Magdalen," of which the Louvre and the Liechtenstein Gallery, Vienna, contain each two examples, the Madrid Museum, the National Gallery, London, and the Pinakothek in Munich, each one. The type of melancholy beauty, familiar through the supposed portrait of "Beatrice Cenci" (1599) in the Palazzo Barberini, Rome, frequently recurs in his paintings. In his art, Guido is an Eclectic, lacking in originality. From a technical standpoint his works are good, both as to color, composition, and drawing; but they are full of sentimentality, and he was one of the first to introduce the soft style so disastrous to the development of art. Consult: Bolognini-Amorini, *Vita del celebre pittore Guido Reni* (Bologna, 1839); Lanzi (Roscoe), *History of Painting in Italy*, iii. (London, 1847); Janitschek, in Dohme, *Kunst und Künstler Italiens*, iii. (Leipzig, 1879); and the authorities referred to under BOLOGNESE SCHOOL OF PAINTING.

RENIER, re-nyā', LÉON (1809-85). A French archæologist, born in Charleville (Ardennes), and educated at Rheims. For a time he was a proof-reader and then became instructor and principal in the College of Nesle in Picardy. Then he went to Paris, taught Latin and Greek for several years, collaborated with Philip Le Bas on the *Dictionnaire encyclopédique de la France* (1840-45), and on Didot's *Encyclopédie*, and was an editor of Courtin's *Encyclopédie moderne* (1845-51). In 1860, after thirteen years in the Sorbonne Library, he became its director and in 1861 became professor of epigraphy at the Collège de France. His great educational work was the foundation of the Ecole des Hautes Etudes with Duruy in 1868. A part of Borghesi's works was edited under his care, and he took a prominent part in the excavations of the Farnesi Gardens, and in the purchase of the Campana collections. His work on the inscriptions of Gaul was not completed; his most important publication was *Inscriptions romaines de l'Algérie* (1855-58).

REN'NELL, JAMES (1742-1830). An eminent British geographer and explorer. He lost his father when a mere boy, but found a home in the family of Mr. Burrington, vicar of Chudleigh, from whom he received his early education. When fourteen years old he joined the frigate *Brilliant* as midshipman, and five years later was an officer in the British Navy. He had already developed a love for geography by study and his many opportunities for surveying harbors and drawing charts. He made such a reputation by his harbor charts that soon after he left the navy in 1763, to take service with the East India Company, he was appointed Surveyor-General of Bengal. For the next fif-

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GUIDO RENI
"AURORA," FROM THE FRESCO IN THE ROSPIGLIOSI PALACE, ROME

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teen years he spent most of his time in the jungle and on the plains of Bengal. The large amount of map material he collected was used in the preparation of the *Bengal Atlas*, which appeared in 1779, a work of the first importance for strategical and administrative purposes. His map of Hindustan, accompanied by about 200 pages of letterpress, appeared in 1783, and marked the time when Rennell ceased to be merely a surveyor and map-maker and became a geographer in the more extended sense. Rennell lived for the remainder of his life in London, and for fifty years, from 1780 to 1830, he was one of the leading geographers of Europe, and the great critic of geographical work and elucidator of geographical problems. Comfortably established with his wife and children in London, he began the construction of the first approximately correct map of India, and many years elapsed before it was superseded by the more accurate trigonometrical survey. He then turned his attention to Western Asia between India and the Mediterranean. He had conceived a scheme for a great work on the comparative geography of Western Asia, but he never completely carried it out, his *Geography of Herodotus*, which formed only a part of the whole project, occupying him for many years. This work has been of permanent value to geographical students.

Rennell's studies of Herodotus made him a very high authority on all matters relating to African geography, and he became the coadjutor of the African Association when that body inaugurated the modern era of the exploration of that continent. His map of Northern Africa, prepared for the use of the association, was the result of immense research combined with sagacious reasoning. He elucidated the reports of explorers, and his maps illustrated their travels. He worked up, for example, the rough notes of Mungo Park, examined his daily routes with great care, compared them critically with previous work in West Africa, and brought all the materials into harmony as far as possible. He constructed the map of the discoveries of Mungo Park. As a hydrographer, also, Rennell made important advances in the study of winds and currents, and was the founder of that branch of geography which is now called oceanography. Rennell's volume on winds and currents is based upon an enormous mass of material which he collected to illustrate the subjects. The current now known as Rennell's current, a stream in the ocean moving northward athwart the mouth of the English and Irish channels, was revealed by his study of a great number of facts collected by seamen. His wind and current charts, published only after his death, contained a large amount of information of service to mariners. His body was buried in Westminster Abbey.

RENNES, rĕn. The capital of the Department of Ille-et-Vilaine, France, at the confluence of the rivers Ille and Vilaine, 155 miles east of Brest by rail (Map: France, E 3). It is divided into the upper or new town and the lower or old town. It has remains of its mediæval walls, towers, and gates, beyond which lie extensive suburbs. Bridges unite the two divisions of the town, the older portions of which lie on the left bank of the quay-lined Vilaine. The most noteworthy buildings are the modern cathedral, whose interior is a spacious hall of Grecian architecture, the stately Palais de Justice, the Hôtel de Ville, the Lycée, the Palais Universitaire with its fine art museum, and the handsome modern university. Tree-lined boulevards, the spacious Champ-de-Mars with a war monument commemorating 1870-71, and the Jardin des Plantes, add to the town's attractions. It carries on an active trade and has manufactures of agricultural implements, stockings, lace, sailcloths, and earthenware. The town is the seat of an archbishopric and of a university, which has an attendance of about 1150. It was almost totally destroyed by a great fire in 1720, and was rebuilt on a modern plan. Rennes is the Celtic Condate, the capital of the Gallic tribe of the Redones, whence the modern name. Under the Romans it was an important station. In the Middle Ages it was the capital of the Duchy of Brittany (q.v.). Population, in 1901, 74,676.

RENNET (from ME. *rennen, rinnen*, AS. *rinnan, yrnan*, Goth., OHG. *rinnan*, Ger. *rinnen*, to run; connected with Lat. *rivus*, stream, Skt. *ar*, to move). A substance obtained from the fourth or digestive stomach of calves living upon milk, and also from the stomachs of puppies and pigs. The active principle is obtained from the folds of the membrane lining the stomach, and is prepared commercially by soaking this lining in warm slightly salted water, filtering the resulting extract, and adding a little salt and saltpetre to preserve it. These extracts are generally used in place of the home-made preparations formerly in use. They are of uniform strength, free from taints, and retain their strength and purity for a considerable time. The active principle, rennin, an enzyme or ferment, has the power of coagulating or curdling the casein of milk. The extracts also contain more or less pepsin, the digestive ferment of the stomach. The action of rennet is impaired by heat, and the ferment is destroyed by high heat. The principal use of rennet or rennet extract is in making cheese, where it is employed to curdle the milk, and thus form the curd. See CHEESE-MAKING.

REN'NIE, GEORGE (1791-1866). An English civil engineer. He was born in Surrey, the eldest son of John Rennie (q.v.), and at the age of sixteen entered Edinburgh University. He returned to London in 1811, and began the practical study of engineering under his father. In 1818 he was appointed superintendent of the machinery of the mint, and at the same time aided his father in the planning and designing of several of his later works. After his father's death, in 1821, Rennie entered into partnership with his younger brother, John (afterwards Sir John Rennie), as engineer and machinery constructor. Their operations included the construction of bridges, harbors, docks, ship-yards, and dredging machinery, steam factories, both in Great Britain and on the Continent, and the furnishing of engines for warships of England, Russia, France, Italy, Mexico, etc. Rennie in addition was engaged in the drainage of large tracts in the midland counties of England and the construction of several Continental railways. He was greatly interested in the development of the screw propeller, and after building the engines for the *Archimedes* boat with a novel form of screw, constructed the *Dwarf*, the first screw vessel in the British Navy. He was the author of various papers published in the *Philosophical Transactions*.

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RENNIE, JOHN (1761-1821). A British civil engineer. He was born at Phantassie, in Haddingtonshire, and obtained his preliminary education at the Parish school of Prestonkirk, and supplemented it by two years at Dunbar, where he studied pure mathematics. After serving as a workman he studied at Edinburgh, and in 1780 secured employment at the works of Boulton & Watt at Soho, near Birmingham. Here his mechanical genius soon displayed itself; and so highly did Watt esteem Rennie that he gave him, in 1789, the sole direction of the construction and fitting up of the machinery of the Albion Mills, London; and the ingenious improvements effected in the wheel-work, shafting, and frames were so striking that Rennie at once rose into general notice as an engineer of great promise. To this mill engineering he added, about 1799, the construction of bridges; and in this branch also his talent and ingenuity were manifest. The elegance and solidity of his constructions, the chief examples of which were at Kelso, Leeds, Musselburg, Newton-Stewart, Boston, and New Galloway, were universally admired; Rennie's greatest work of this kind was the Waterloo Bridge over the Thames. Another of his works was the Southwark Bridge, which was built on a new principle, with cast-iron arches resting on stone piers. He also drew up the plan for the London Bridge, which, however, was not commenced until after his death. He superintended the execution of the Grand Western Canal in Somerset, the Polbrook Canal in Cornwall, the canal joining the Don and Dee in Aberdeen, that between Arundel and Portsmouth, and, chief of all, the Kennet and Avon Canal between Newbury and Bath. The London Docks, the East and West India docks (see DOCK) at Blackwall with their freight sheds, the Hull Docks, the Prince's Docks at Liverpool, and those of Dublin, Greenock, and Leith, were all designed and wholly or partially executed under his superintendence. He also planned many improvements of harbors and on the dock yards of Portsmouth, Chatham, Sheerness, and Plymouth, executing at the last-mentioned port the most remarkable of all his naval works, the celebrated breakwater. (See BREAKWATER.) Rennie died October 16, 1821, and was buried in Saint Paul's Cathedral, London. Consult Smiles, *Lives of the Engineers* (London, 1861-62; rev. ed. 1874).

RENNIE, Sir JOHN (1794-1874). An English civil engineer. He was born in London of a great engineering family, being a son of John Rennie (1761-1821), with whom he studied until 1813, when he became Hollingsworth's assistant on the Waterloo Bridge. With his father he worked on the Southwark Bridge in 1815, and after studying abroad went into partnership with his brother. John Rennie was knighted in 1831 on the completion of the London Bridge after his father's plans. He also finished his father's work as engineer to the Admiralty, building the Plymouth breakwater, and draining the Lincolnshire fens. The Whitehaven and Cardiff docks and the restoration of Boston harbor are the most important of his original works. Rennie was an able hydraulic engineer and author of *Theory, Formation, and Construction of British and Foreign Harbors* (1851-54). Consult his autobiography (London, 1875).

RENO. The largest city of Nevada and the county-seat of Washoe County, 31 miles south of Carson City; on the Truckee River, and on the Southern Pacific, the Virginia and Truckee, and the Nevada, California and Oregon railroads (Map: Nevada, D 2). It is the seat of the Nevada State University, opened in 1886; and among other features are the United States Government Agricultural Experiment Station and the Nevada State Hospital for Mental Diseases. Reno is situated in a section devoted to farming, mining, and stock-raising, and is the most important business and industrial centre in the State. Settled in 1868, Reno was incorporated in 1897, but was disincorporated two years later. It received its present city charter in 1903. Population, in 1890, 3563; in 1900, 4500.

RENO, JESSE LEE (1823-62). An American soldier, born at Wheeling, Va. (now W. Va.). He graduated at West Point in 1846; was brevetted second lieutenant of ordnance; and soon afterwards was ordered to the front in Mexico, where he fought under General Scott from Vera Cruz to the City of Mexico. From that time until 1861 he was employed in various routine duties and advanced to be captain. On the outbreak of the Civil War he was commissioned brigadier-general of volunteers and was assigned to a brigade in General Burnside's North Carolina expedition (December 20, 1861-April, 1862), with which he participated in the capture of Roanoke Island, and the actions of Newbern and Camden. For these services he was promoted to be major-general of volunteers, and in August was ordered north to Virginia, where he fought in the second battle of Bull Run and at Chantilly. During the succeeding Maryland campaign he commanded the Ninth Corps, and was killed leading his men at the battle of South Mountain.

RENOIR, re-nwär', AUGUSTE (1841—). A French figure and landscape painter, born in Limoges. He studied in the atelier of Gleyre and with Monet and the other Impressionists, and exhibited in 1874 at the first Impressionist Salon. Renoir is one of the most distinctive of the group, and, like Degas, devoted himself principally to figures, especially portraits of young women and children, in which he renders the texture of flesh and the most fleeting shades of expression with astonishing adroitness. His figures are painted out of doors, and are subject to every variation of light and reflection. He also painted landscape, fruit, and flower subjects, and groups of figures. His paintings include: "La loge;" "La danse;" "Danse à la ville;" "Le déjeuner à Bougival;" "La balançoire;" "Le pont de Chatou;" and "Jeunes filles au piano." Among his portraits are those of Wagner and Claude Monet. Consult: Duret, *Les peintres impressionistes* . . . (Paris, 1879), and Alexandre, *Catalogue de l'Exposition de A. Renoir* (Paris, 1892).

RENOUF, re-nōōf', EMILE (1845-94). A French landscape, marine, and genre painter, born in Paris. He was a pupil of Boulanger, Lefebvre, and Carolus Duran. His works usually represent scenes in the lives of fisherfolk or purely marine subjects. "The Helping Hand" (in the Corcoran Gallery at Washington, D. C.), a boatman rowing while his child holds the oar, is one of his best-known works. He also painted several views near Honfleur, and a picture of the

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Brooklyn Bridge (in the Havre Museum), done while he was in New York City in 1887-88. He received a medal of the first class at Munich in 1883 and the Legion of Honor in 1889.

RENOUF, Sir PETER LE PAGE (1822-97). An English Egyptologist, born in the island of Guernsey, August 23, 1822. He received his early education at Elizabeth College and went later to Oxford, where he formed a lasting friendship with the Rev. John Henry, afterwards Cardinal, Newman. He took an active part in the Tractarian controversy, and in 1842 was received into the Roman Catholic Church at Saint Mary's College, Oscott, where he began the study of Oriental languages together with theology and philosophy. In 1846 he undertook the tuition of the young Marquis de Vaulchier, and until 1855 resided on the Continent, where he formed the acquaintance of many of the most distinguished scholars of the time. From 1855 to 1864 he was professor in the Catholic University at Dublin, lecturing at first upon French literature and the history of philosophy, and later upon ancient history and Oriental languages. It was during this time that he took up the study of Egyptian, and he soon became one of the foremost as well as one of the most conscientious and reliable Egyptologists of his day. In 1864 he left the university to accept an appointment from the Government as one of the chief inspectors of schools, a position which he held for over twenty years. He visited Egypt in 1875 and spent some time there studying the monuments. From March, 1886, until the end of 1891 he was keeper of the Egyptian and Assyrian antiquities in the British Museum, and in 1896 he was knighted in recognition of his distinguished scholarship. From 1887 until his death he was president of the Society of Biblical Archæology. He died in London, October 14, 1897. Renouf was a versatile scholar, and in addition to his Egyptological attainments he possessed a knowledge of most of the ancient and modern Semitic, Indo-European, Berber, and Finnic languages. In his later years he also became a student of Chinese. He was a very prolific writer and contributed a large number of valuable articles to *Atlantis*, *Proceedings of the Society of Biblical Archæology*, *Zeitschrift für ägyptische Sprache*, and other periodicals. He also translated a number of Egyptian texts for *Records of the Past*. In 1879 he delivered the second course of the Hibbert Lectures, and the following year he published his *Lectures on the Origin and Growth of Religion, as Illustrated by the Religion of Ancient Egypt* (1880; 2d ed. 1884). Renouf's great work was his masterly translation of the Egyptian Book of the Dead (q.v.), the study of which formed his chief occupation for nearly forty years. The translation, accompanied by a valuable commentary, was published serially in the *Proceedings of the Society of Biblical Archæology* (vol. xiv., 1892, et seq.) and was unfinished at his death, but was completed from the author's manuscript notes by E. Naville (q.v.). A biography of Renouf and a full bibliography of his writings are to be found in *Proceedings of the Society of Biblical Archæology* (vol. xix., London, 1897).

RENOUVIER, re-nōō'vyā', CHARLES BERNARD (1815—). A French philosopher and politician. He became known through his *Manuel de philosophie moderne* (1842) and his *Manuel de philosophie ancienne* (1844). After the Revolution of 1848 he published a *Manuel républicain de l'homme et du citoyen* (1848), which was condemned for its socialistic propositions. He retired from public life after the coup d'état of 1851. From 1872 until 1900 he was associate editor of *La Critique philosophique*, and he published *Essais de critique générale* (1854), *Science de morale* (1869), and *Esquisse d'une classification systématique des doctrines philosophiques* (2 vols., 1885).

RENO'VO. A borough in Clinton County, Pennsylvania, 28 miles northwest of Lock Haven, on the Philadelphia and Erie division of the Pennsylvania Railroad (Map: Pennsylvania, D 2). It is of some importance as a summer resort, being situated near the Alleghany Mountains, in a picturesque region. There are valuable deposits of bituminous coal and fire clay, and manufactories of fire brick; shops of the Pennsylvania Railroad are here. Population, in 1900, 4082.

RENSSELAER, rĕn'se-lēr. A city in Rensselaer County, New York, on the Hudson River, directly opposite Albany, with which it is connected by three bridges, and on the New York Central and Hudson River and the Boston and Albany railroads (Map: New York, G 3). It is situated in an agricultural and dairying region, and manufactures felt, leather, ice tools, chains, shirt waists, and lumber products; but is important chiefly as a railroad town, having shops, roundhouses, freight yards, etc. Rensselaer was chartered as a city in 1897, having been known formerly as Greenbush, which was incorporated as a village in 1815. In 1902 the village of Bath, with a population in 1900 of 2504, was annexed to Rensselaer. Population, in 1890, 7301; in 1900, 7466.

RENSSELAER POLYTECHNIC INSTITUTE. A school of engineering and science at Troy, New York, founded by Stephen Van Rensselaer in 1824 as Rensselaer School and reorganized in 1850 under the present name on the basis of a general polytechnic institute. It was the first school of science and the first school of engineering established in any English-speaking country, and has long been famous for its engineering courses. Opportunities for investigation and research are offered by the many well-known engineering works within reach of the school. In 1902 the electrical and chemical laboratories were destroyed by fire, but were rebuilt, and with the other laboratories are equipped with machinery and appliances of the most modern type. The students in 1903 numbered 309 and the faculty 20. The Institute owns valuable collections and a scientific library of 6700 volumes and 3500 pamphlets.

RENT (OF., Fr. *rente*, It. *rendita*, income, from ML. *rendere*, nasalized form of Lat. *reddere*, to restore, return). In political economy, the term rent, when used without a qualifying phrase, refers to the payment which is made for the use of land. In the payments popularly known as rent are usually included two elements, one of which may be classed as interest on buildings and other improvements, the other as economic rent. The economic rent of any given piece of land is measured by the difference between the prices which its products obtain and the cost of

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the labor and capital employed in producing them.

Assuming the conditions of a new community with an abundance of accessible land, good and bad, it is obvious that so long as the produce of the best land is more than sufficient to satisfy the community's wants there will be no rent. Producers will be on an equality, and if any difference exists between the value of the product and the costs of production in labor and capital, it will be the same for all. As population increases the product of the best grade of lands no longer suffices to satisfy the want for food. Prices of food will rise until it will pay to bring inferior lands under cultivation. Permanent prices will have to be sufficient to cover costs in labor and capital upon these inferior lands. Since the cost of production on the better land does not increase, a surplus value will emerge in the produce of these lands. This surplus value is rent. If the owner of the better land cultivate the ground not in person, but by tenants, this surplus is what the latter can afford to pay the landlord for the use of his land. If the favored producers are themselves cultivators, they receive the rent directly in the increased returns of their husbandry.

This simple illustration suffices to explain the law of rent, which may be briefly stated as follows: Rent of land is the difference between the cost of the product and its value, the latter being determined by the cost of production upon the poorest land cultivated. In an isolated community the increase of population and the resulting pressure upon the food supply must always enhance rent, as cultivation must be extended from better to poorer soils. In other words, the pressure of population upon the means of subsistence creates rent on those lands where the means of subsistence can most easily be produced. Again we may assume all the available land of the community to be in cultivation and yet the pressure upon the means of subsistence increases. Now even if all the land were uniform in quality but deficient in quantity rent must appear. No increase of product can be obtained without application of additional labor and capital to the soil. This will not be so fruitful as the first application, and hence the latter must yield a rent. In this phase the law of rent may be stated as follows: The rent of land is the difference between the value of the product and its costs, value being determined by the costs of production for the product due to the least fruitful increment of capital and labor employed in cultivation. It follows that rent is a result, not a cause of price. This principle was demonstrated by Ricardo and until recent decades was thought to establish a perfectly clear distinction between rent and other economic incomes. The rise of the Austrian school of economists (see POLITICAL ECONOMY) has, however, tended to break down this distinction in incomes. Labor and capital, like land, receive their value from their product. While it is true that no form of goods will long be produced which does not pay the prevailing rates of interest and wages, it is no less true that an agricultural product will not be produced unless it pays the ordinary rate of rent.

One of the most important practical principles that have been deduced from the demonstration of the law of rent is that a tax levied upon rent or upon the value of land, which represents merely the capitalization of the rental value, cannot raise the price to the consumer of the product of the land. This principle has served as a basis for the plan of social reform of Henry George. (See SINGLE TAX.) The fact that every increase in population or in capital increases the return to the landlord quite without his own efforts served as an ethical justification for a plan of appropriation to the State of ground rents. Recent economic theory has widely extended the application of the theory of rent. Since the time of Senior (q.v.) the term has been frequently applied to the net income from monopoly advantages, whether natural or legal. Profits (q.v.) are frequently classed as a form of rent; and Clark applies the term to any form of income which may be described differentially.

In the language of Marshall, "the rent of land is no unique fact, but simply the chief species of a large genus of economic phenomena; the theory of the rent of land is no isolated economic doctrine, but merely one of the chief applications of a particular corollary from the general theory of demand and supply." The theory of the rent of land occupies a large space in all systematic presentations of political economy. A compact statement is found in Walker, *Land and Its Rent* (Boston, 1883).

RENT. In its most ancient as well as its modern sense, compensation payable by a tenant to his landlord for the land held of him. Rent has never been an incident of tenure, but even under the feudal system of land-holding and when due from tenant in fee simple to his lord, rent was due only as matter of contract. It was, indeed, the service agreed by the feudal tenant to be performed (*servitium redditum*), which might or might not include a money payment, and which varied according to the tenure upon which the land was held, according to the custom of the manor of which it formed a part, or according to the will of the parties.

In much the same way the obligation of the modern tenant for life or years to pay rent to his landlord is based entirely on agreement expressed in the lease or implied from the acts of the parties as to the time and manner as well as the duty of payment. This being so, a failure to pay rent does not ordinarily affect the relation of landlord and tenant so as to enable the landlord to enter and terminate the lease, nor can a tenant by terminating the relation of tenure between himself and his landlord (as by assigning his entire estate to a third person) relieve himself of the obligation to pay the rent agreed. Rent is equally independent of any other violations of duty by either party, excepting only the breach of the covenant for quiet enjoyment implied in every letting of lands.

As already indicated, a failure to pay rent does not in and of itself involve a forfeiture of the tenant's estate. The landlord's proper remedy is an action at law for the rent due. At common law, however, he was provided with a more efficacious remedy in the process known as levying a distress. See DISTRESS.

The rents described by Blackstone in his famous chapter on incorporeal hereditaments (Blackstone II. 41-43), as "certain profits issuing yearly out of lands and tenements corporeal," are obviously a very different thing from those which have just been described. The rent here

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referred to is a right in the nature of an easement, or more accurately a profit *à prendre*, in the land of another, and it comes into existence, not by agreement or in connection with a lease, but, as such incorporeal rights always do, by grant or prescription. The right to take the rent is a species of real property which may be held, like any other estate, for life or years or in fee, and which is capable of alienation, and, if held in fee, of transmission by inheritance. The common law distinguished three kinds of such rents, viz. rent service, rent charge, and rent seck. The *rent service* was merely the old feudal rent surviving into a period which had forgotten its origin. It existed only when lands were held by one of another in fee, and where, accordingly, the rent due was in the nature of a feudal service. The *rent charge* is the rent just described as arising by grant of the owner of the land on which it is charged. The distinguishing characteristic of this was the fact that it was enforceable by distress. The *rent seck* was merely the rent charge without the power of distress annexed. Of these three forms of rent the rent service is obsolete, excepting, perhaps, in a few manors in England (see QUIT-RENT); rent charge survives unchanged except where distress has been abolished, and there all rents charged on land by deed or will are properly rents seck. It is to the class of rents charge, rather than of contract rents, that we must refer the so-called *fee-farm rents*. See FEE.

Consult the *Commentaries* of Blackstone and Kent; Williams, *Law of Real Property* (19th ed., London, 1901); Maine, *Early History of Institutions* (Amer. ed., New York, 1895). See INCORPOREAL; HEREDITAMENT; LANDLORD AND TENANT; LEASE.

RENUNCIATION. In law, the disavowal or abandonment of an official or property right. Of the latter class are the renunciation by an heir, deviser, or legatee of the property, real or personal, to which by operation of law or under the will of his testator he is entitled. Of the former class is the more frequent case of the refusal by an executor, administrator, or trustee of the office conferred upon him. The formality of renunciation is in either case of the simplest character, a letter or other written expression of intention being the usual form. In Scotland the term renunciation is employed to denote the surrender (q.v.) of an estate for life or years to the landlord.

REN'WICK, JAMES (1662-88). A Scottish Covenanter, born at Moniaive, Dumfriesshire. He was a student at Edinburgh University, but received no degree there, because of his refusal to acknowledge Charles II. as head of the Church, and therefore finished his theological education at Groningen, Holland. In 1683 he returned to Scotland and began preaching at conventicles. He was outlawed for his collaboration with Alexander Shields in *An Informatory Vindication of the Covenanters* (1684). In 1687 he had become the virtual leader of the Cameronians, who were excluded from the Act of Toleration, and was finally captured and executed at Edinburgh.

RENWICK, JAMES (1818-95). An American architect. He was born in New York and educated at Columbia College. He constructed the distributing reservoir of the Croton Aqueduct in New York City and was for some years an architect on the Erie Railroad. Among the buildings designed by him are Vassar College, Poughkeepsie, New York; Saint Patrick's Cathedral, Grace, and Calvary Church, New York; and the Smithsonian Institution and Corcoran Gallery at Washington. He left a valuable art collection to the Metropolitan Museum.

REPAIRS. In the law of real property, such acts of construction and amendment as are necessary to keep the buildings of an estate from deterioration and decay. By the common law of England and America the obligation to repair rests on the tenant in possession, whether his estate be for life or years. It is, in fact, an incident of such a tenancy and flows from the doctrine of waste, and this includes the wholesale restoration of premises destroyed by fire, as well as current repairs called for by ordinary uses or mere lapse of time, excepting where (as now generally in the United States) this harsh rule of the common law has been modified by statute. The obligation to repair does not extend to a tenant at will or at sufferance, nor to a joint tenant or tenant in common (whether in possession of the premises or not), nor generally to a mortgagee in possession.

This common-law obligation of the tenant to keep the premises in repair is sometimes varied by local custom and more frequently by agreement of the parties. See EVICTION; LANDLORD AND TENANT; LEASE; WASTE.

REPARATION (Lat. *reparatio*, from *reparare*, to restore, repair, from *re-*, back again, anew + *parare*, to prepare). In law, the redress of an injury by making compensation therefor, or by restoring something which has been unlawfully taken from one entitled to its possession. See DAMAGES.

REPEAL (OF. *rapeler*, Fr. *rappeler*, to recall, revoke, repeal, from *re-*, back + OF. *apeler*, Fr. *appeler*, to call, appeal, from Lat. *appellare*, to address, appeal, to call, summon). The obliteration or abrogation of a statute by another act of a legislative body. Where an act declares in positive terms that another shall be abrogated, it is said to be an *express* repeal, but where a statute contains absolutely inconsistent provisions with a prior one, and does not refer to it directly, it is said to repeal the latter by *implication*. It is in the latter class of cases that the greatest difficulty arises. The provisions of the subsequent act must be absolutely contrary or repugnant to those of the former, so that it is clear that they must have been intended to supersede the former, in order to work out a repeal by implication. An act may repeal only portions of another, and the provisions not thus expressly repealed will continue in force. The same is true where a subsequent statute is only inconsistent with a former one in some provisions. Where it is desired to alter some of the provisions of an act, it is usually *amended*, by striking out some part of it and substituting new provisions. An amendment, therefore, is a change or alteration, whereas a repealing act abrogates or wipes out the provisions of the statute to which it applies. Under the common law the subsequent repeal of an express repealing act has the effect of restoring or reviving the statute which had been abrogated by the latter, but this

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rule has been abolished in England and many of the United States.

REPEATING RIFLE. See SMALL ARMS.

REPENTANCE (OF., Fr. *repentance*, from ML. *repentens*, repentant, from Lat. *re-*, back again, anew + *pœnitere*, to repent, frequentative of *pœnire*, *punire*, to punish, from *pœna*, punishment, expiation, pain, from Gk. ποινή, *poinē*, punishment; connected with Gk. τίνειν, *tinein*, Skt. *ci*, to avenge). Sorrow for sin and renunciation of the same. It is intimately connected with faith (q.v.), since faith is the turning of the soul toward God, and repentance is the same act considered as a turning away from sin. It is synonymous with conversion when used of the original and decisive abandonment of sin which marks the beginning of the Christian life; but, unlike conversion, which occurs but once, daily repentance should follow daily sins. It is a consequent of regeneration (q.v.), which is God's act calling forth repentance and conversion. Adequate repentance embraces all sin as such, known or forgotten, and involves the condemning sentence of conscience and the voluntary activity of the will in forsaking it, and both choosing and executing acts of holiness in its place. The motive leading to an evangelical repentance must be nothing short of a perception of the evil of sin in itself, as violating the law of conscience and of God. Any lesser motive, as sense of danger or fear of the wrath of God, is not sufficient to produce a true repentance, which must embrace the love of God and sincere submission to His holy will. Every act of repentance involves a new girding up of the soul to new resistance to temptation. Such repentance is always accepted of God and followed by the divine forgiveness.

REPHAÏM, rĕf'ā-ĭm *or* rē-fā'ĭm (Heb. *rĕphāīm*). (1) A popular name of the prehistoric inhabitants of Palestine, especially to the east of the Arabah (q.v.). The Hebrew *rāphā* means 'weak,' and hence is used of the shades of the dead (e.g. Is. xiv. 9). The term appears to have been applied to the early legendary inhabitants, whose ghosts were supposed still to haunt their ancient homes. But the myth-making process magnified them into giants, and the word received this connotation. In this sense the word may be used in II. Sam. xxi. 16 et seq. Most definite are the interesting antiquarian notes in Deut. ii. 10, 20, where reference is made to the predecessors of Moab and Ammon, and they are described as a gigantic folk; compare the tradition concerning the Anakim, whom Israel encountered in South Palestine (Num. xiii. 33). In Deut. iii. 11, Og, the King of Bashan, is recorded as a descendant of this gigantic race, and the proof of his stature is given in an enormous bedstead of iron. These notes are paralleled by the ethnology of Gen. xiv. Consult Driver, *Commentary on Deuteronomy*, p. 40 (London, 1895). (2) *The Valley of Rephaim*. The scene of the two battles in which David broke the power of the Philistines (II. Sam. v. 18, 22; xxiii. 13; I. Chron. xiv. 9 et seq.); also famous for fertility (Is. xvii. 5). The location is given in Josh. xv. 8, 9; xviii. 16, as contiguous to the Valley of Hinnom, and is identified with the broad valley running for two miles southwest from Jerusalem, a strategic vantage-point for the invaders, and also affording coöperation with the non-Israelitish city of Jerusalem. Some would associate the name with the race of the Rephaim.

REPH'IDIM (Heb. *Rĕphīdīm*, probably refreshments, from *rāphad*, to support, succor). A station in the route of Israel through the peninsula of Sinai (Exod. xvii. 1, 8; xix. 2; Num. xxxiii. 14 et seq.). It was the scene of a rebellion of the people for lack of water, which Moses supplied by a miracle, whence, according to tradition, the names Massah (tempting) and Meribah (striving) were given to the place. Here Israel routed Amalek by miraculous interposition, an account of which was recorded in writing. Here Jethro, Moses's father-in-law, paid him a visit. But, as in the case of most of the Sinaitic stations, no local tradition of the name survives. It has often been identified with the oasis of Feiran, north of Mount Serbal; it would be a fitting prize of war between Amalek and Israel, but, on the other hand, the lack of water does not agree with the nature of the oasis. The modern theory, which takes the Exodus through the northern part of the peninsula, finds there no tradition of the name. Consult: Robinson, *Biblical Researches*, vol. i. (Boston, 1841); Palmer, *Desert of the Exodus* (Cambridge, 1871).

REPIN, ryā'pĭn, ILIA YEFIMOVITCH (1844—). A noted Russian painter, born in the Government of Kharkov. The son of a poor Cossack officer, he was first instructed by an obscure painter in his native place, and soon earned a living by painting saints' images until enabled, in 1865, to attend the Academy at Saint Petersburg, where his "Raising of Jairus's Daughter" (1871) brought him the great gold medal, accompanied by a stipend entitling him to study abroad for six years. His real master, however, had been Ivan Kramskoy (1837-87). Before starting on his travels, he painted (1872) at Moscow a series of life-size portraits of Russian, Polish, and Czech composers for a concert hall, and in 1873 he exhibited in Vienna the "Burlaki" (Barge-men on the Tow-path), a remarkable work. His best picture, dating from his foreign sojourn, was "Szadko in the Wondrous Realm of the Sea," based upon a national legend. For this he was elected a member of the Academy (1876), where he subsequently became professor. Among a series of historical and legendary subjects and genre scenes which followed, the best known are: "The Czarevna Sofia at the Chapel-Window" (1879); "Return of the Dying Soldier" (1883); "Back from Siberia" (1884); "Ivan the Terrible and His Slain Son" (1885), and "Saint Nicholas Staying an Execution" (1889), the last two in the Alexander Museum, Saint Petersburg. After 1886 he devoted himself almost exclusively to portraiture, his subjects including Liszt, Rubinstein, Garshin, Pissemski, and Tolstoy. Characteristic of Repin's earlier work is the element of gloom and oppressiveness. He interpreted what he saw of the dumb, patient suffering around him, and, like Tolstoy, had the profoundest compassion for humanity. A happier atmosphere pervades some of his later pictures, and technically all his works exhibit great power and freedom of treatment, subsiding occasionally even into impressionism. A humorous note—unusual in this artist—is sounded in the "Holiday

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Evening" (1881) and "Country Life in the Crimea" (1888). The Tretiakoff Gallery in Moscow preserves more than fifty of his paintings. Consult the monograph by Norden (Vienna, 1894); Hapgood, "A Russian National Artist," in *The Century Magazine*, xxiii. (New York, 1892); and Muther, *A History of Modern Painting*, iii. (ib., 1896).

REPLEVIN (OF. *replevin*, from *replevir*, from ML. *replivire*, to warrant, pledge, from *re-*, back again, anew + *plevire, plegiare*, to pledge). An action brought to recover the possession of goods and chattels unlawfully taken, or wrongfully detained. Under the old common law practice it was only employed to recover back goods which had been unlawfully taken from the owner, as by the ancient proceeding of distress for rent, and *detinue* was used for the recovery of chattels unlawfully detained. To-day in most jurisdictions replevin, or some action of like nature, is employed for the recovery of chattels wrongfully withheld. In the action a writ is issued for the seizure of the goods, and the plaintiff is required to file a sufficient bond to cover damages which may result to the defendant. The defendant may by statute in some States give a bond and retain possession until the action is determined. Any person who is entitled to the possession of property may maintain the action, and the defendant must rely on the strength of his own rights rather than on the weakness of the plaintiff's title. The plaintiff should allege in his complaint or declaration the value of the chattels, and what damage he has sustained, and in such case is entitled to an alternative verdict and judgment commanding the return of the goods, and if that is not possible, the payment of their value, and in each case damages for their detention. The defendant must return the goods if possible, and he does not have the option of paying their assessed value instead. If the defendant is successful he is entitled to recover such damages as he has sustained, and may sue on the plaintiff's bond. Replevin is a possessory action and corresponds to ejectment (q.v.) as to real estate. See CHATTEL; DETINUE; TROVER; PROPERTY.

REPLICA. See COPY.

REPORT. A written or printed account of a case which has been judicially determined. Such an account, in the most complete and accurate reports, is usually composed of a brief statement of the facts of the case prepared by the editor or the reporter, a brief summary of the arguments of counsel, including a statement of the authorities cited by them on the argument or in their briefs, and the opinion of the court. The opinion also frequently contains a statement of the facts, a statement of the court's decision of the case, and the reasoning and the authorities upon which the decision is based. The report of the case may also include dissenting opinions. The value and use of precedents in the English common law (see PRECEDENT) make the careful preparation and preservation of reports of decided cases of the highest importance. Beginning with the reports of cases contained in the Year Books (Edw. II. to Henry VIII.) there is a complete series of reports of cases decided in the higher English courts down to the present time. In each of the United States there are published reports of all cases decided by the courts having appellate jurisdiction, going back to the date of their organization; and there are also complete reports of the cases decided in the United States Supreme Court and the inferior Federal courts having appellate jurisdiction since their creation under the United States Constitution.

The Year Books were prepared at public expense by scribes of court or reporters who were appointed to that duty, a function which unfortunately was abandoned at the close of the reign of Henry VIII. After that time the reports were the work of private lawyers, and they sometimes bear evidences of hasty and inaccurate preparation. Some of them, however, prepared by lawyers of great learning, are of the highest value as authorities. The various editors of English reports number in all about one hundred. The following are a few of the more important early law reports following the Year Books: Dyer (1513-82), Coke (1572-1618), Hobart (1603-25), Croke (1582-1641), Yelverton (1603-13), Saunders (1678-84), Vaughan (1665-74), Raymond (1694-1734), Salkeld (1689-1712), Strange (1716-49), East (1800-12). The first chancery reports were published after the Restoration, although West's *Symboleography*, published in the latter part of the reign of Elizabeth, contained some precedents of process, bills, and answers in chancery. The first chancery reports, entitled "Reports of Cases Taken and Adjudged in Chancery in the Reign of Charles I., Charles II., James II., William III., and Queen Anne," were inaccurate and of little value. Of the other early chancery reports the following are the more important: Vernon (1680-1719), Peer Williamson (1700-35), Vesey, Sr. (1746-1856), Vesey, Jr. (1789-1817), and Atkyns (1736-54).

In the United States generally, reports of cases are now published by public officials appointed for that purpose by the court, and in those States in which the law and equity systems have been merged, law and equity cases are published together. The increase in volume of litigation has resulted in recent years in an enormous increase in the number of reports, and has led to the consideration of various plans for curtailing their number.

Consult: Wallace, *The Reporters Chronologically Arranged with Occasional Remarks on Their Respective Merits;* Daniel, *History and Origin of Law Reports* (London, 1884); Wambaugh, *Study of Cases* (Boston, 1884). For a complete list of reports, see Soule, *Lawyers' Reference Manual of Law Books and Citations* (Boston, 1884).

REPOUSSÉ (Fr., beaten back). A process of ornamenting thin metal by producing a pattern or design with a hammer. The finest existing specimens of this work are those of Benvenuto Cellini (q.v.), made in the sixteenth century. The art was extensively practiced by the early Egyptians and Etruscans.

In repoussé work a hammer with an elastic handle is used, which is screwed to a permanent support. Many adjustable heads are provided to suit the different parts of the work. After the pattern is roughly hammered up from the inside the design is perfected on the outside with chasing tools. In order to make this possible, a bed of some soft but resisting material is used to furnish a support for the thin, pliant metal. If the work is a hollow vessel it may be filled with melted pitch, which is permitted to harden.

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This art is most successfully applied to such malleable metals as gold, silver, copper, tin, and lead. A similar effect, though lacking in artistic merit and in individuality, is produced by stamping with dies. See DIES AND DIE-SINKING; EMBOSSING.

REPPLIER, AGNES (1855—). An American essayist of French descent, born in Philadelphia, Pa., April 1, 1855. Miss Repplier was educated at the Convent of the Sacred Heart at Torresdale, Pa. She is known for her travels and for many articles in such magazines as *Scribner's* and the *Atlantic Monthly*. Her lively essay style often deals with serious subjects in a vein of light, humorous banter, sometimes tinged with extravagant and witty irony. Her published volumes include: *Books and Men* (1888); *Points of View* (1892); *Essays in Miniature* (1892); a *Book of Famous Verse* (edited, 1892); *Essays in Idleness* (1893), perhaps her most popular work; *In the Dozy Hours, and Other Papers* (1894); *Varia* (1897); *Philadelphia: The Place and the People* (1898); *The Fireside Sphinx* (1901).

REPRESENTATION (Lat. *repræsentatio*, from *repræsentare*, to represent, from *re-*, back again, anew + *præsentare*, to present, from *præsens*, present, pres. part. of *præesse*, to be at hand, to be before, from *præ*, before + *esse*, to be). In political science, the agency through which the collective will of the people is exercised. In the city States of Greece and Italy, where pure democracies prevailed, all the citizens, in theory at least, attended the public assemblies. The comparatively small geographical area of the city State and the relatively small number of persons vested with the full rights of citizenship made it possible to govern without resort to the agency of representation. Besides, government was a simple matter then as compared with the government of a modern community, and hence the body of citizens meeting at intervals could without difficulty frame the few police regulations that were necessary and administer justice among the inhabitants. The agency of representation was first extensively employed by the Church in the ecumenical councils which it called from time to time, and this may have led to its more general employment for purposes of civil government. The idea of political representation, like many other political institutions, was a contribution of the Teutonic nations, by whom it was employed in a rude way in their popular assemblies. The first European legislature founded on the principle of representation was the Parliament of England. (See PARLIAMENT.) In 1302 Philip the Fair, King of France, summoned representatives of the three estates, nobility, clergy, and commons, to form the States-General (q.v.). In Aragon the Cortes (q.v.) acquired a very important share in the government, and grew to be powerful enough to impose its will upon the monarch. In other countries of Europe about the same time national representative bodies were summoned by royal authority. The mediæval idea of representation was representation of classes and interests rather than of numbers, which is the basis of the modern idea. Each order had its own representatives, who sat apart and carried on their work independently, one class thus being able to neutralize the action of the others. A distinction was made in England between rural and urban constituencies, each having its own representatives, and this is still perpetuated.

With regard to the principle of representation it may be said that the civilized nations have reached a consensus that the distribution of representatives, in one branch of the legislature at least, should be on the basis of the whole population, though some regard is frequently paid to permanent administrative or local divisions, partly for historical reasons and partly as a concession to local consciousness. Thus it is a common provision in national constitutions that each State or other division shall have at least one representative in the national legislature, although on the basis of population alone it would not be so entitled. (See section on *Government*, under the various countries.) In the upper chambers of lawmaking bodies throughout the world there is considerable diversity in the principle of representation. See LEGISLATURE.

As regards the relation of the representative to his constituency, a popular view is that the representative is the mouthpiece of his constituency and subject to their instructions. According to this view he has no independent judgment, and cannot follow the convictions which he may have reached from the most exhaustive study and reflection, if the will of his constituency be otherwise. Moreover, their own local interests are to be preferred to those of the country at large, and it is his first and foremost duty to champion those interests in preference to the national interests. A sounder view regards the representative as the interpreter of the common consciousness of right and reason. According to this view the representative is not bound by the will of his constituency, but by research and reason endeavors to discover what the general good requires. The question has been much discussed as to whether a system of representation based on mere numbers is an ideal one or even a just one. By many it is contended that an equitable system of representation would take into consideration various interests, economic, industrial, social, and religious as well as political. They insist that provision should be made for special representation of such classes as free-traders, single-tax adherents, labor organizations, civic federations, business leagues, chambers of commerce, the advocates of temperance and prohibition, socialists, etc. The tremendous tendency toward class differentiation and the growing popularity of independent movements in politics, it is said, make a reform of the present system of representation highly desirable so as to harmonize conflicting interests, to enable each class to show the people what its interests are, and to defend them against attack.

By the present system, the political party having a minority of voters in a given electoral district is generally unrepresented in the government, notwithstanding the fact that its numerical strength may lack but a few votes of equaling the party which secures the entire representation. As a result of this system, it frequently happens that the minority party in a State is inadequately represented in the State legislature or in Congress. To remedy these inequalities various methods have been proposed, and in some cases attempted. Of the more important of these the first to be mentioned

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is the so-called 'limited vote,' according to which each voter in an electoral area is allowed to vote for a certain number of the candidates, usually one less than the number to be elected, so that if three members are to be elected from the district the minority is reasonably sure of electing one member. This method may be employed only in elections in which three or more representatives are to be chosen from the district. The chief objection to this method is that it does not allow the minority party proportional representation, but only limited representation. Moreover, it allows representation only to a very large minority and makes no provision for third parties and independent movements. Another method is the so-called 'cumulative vote,' which allows the elector as many votes as there are representatives to be chosen from the district, and which permits him to distribute them among the different candidates as he pleases, or cumulate them on one or more candidates. The advantage of this method over the first mentioned is that it enables a small minority to elect at least one member by cumulating their votes. Since 1870 it has been employed in Illinois for the election of representatives in the Legislature. The chief objection to this method is that it frequently involves a waste of votes, since a popular candidate may receive many more votes than actually necessary to elect him. As a result of this it may happen that the minority party actually succeeds in electing two representatives out of three.

What is known as the Hare or Andræ system, so called because proposed by an Englishman named Hare, and introduced into Denmark by Andræ, provides for the election of representatives by general ticket, and allows each elector to vote for one candidate or for a limited number, but permits him to indicate his second and third choices, etc. The total number of votes cast is divided by the number of representatives to be chosen, and the quotient is taken as the amount necessary to elect any candidate. In counting the ballots only the first choices are counted, and as soon as a candidate has received a number of votes equal to the electoral quotient he is declared elected, and no more votes are counted for him. The remaining ballots which designate him as first choice are then counted for the candidate having second choice, and so on down the list until the necessary number of persons have been declared elected. Under this system the waste of votes is insignificant, but its complexity is an objection, and the element of chance enters into the scheme. Finally there is the 'free list' system, according to which a certain number of voters may nominate a number of candidates not exceeding the number of places to be filled. Each voter casts as many votes as there are representatives to be chosen, distributing them at will, but not cumulating them on any one candidate. The number of votes necessary to elect is determined by dividing the total vote cast by the number of places to be filled. The total vote cast by each party is then divided by the electoral quotient and the result is the number of representatives to which each party is entitled. Any deficiency is supplied from those parties having the largest fractional quotas. This plan possesses the advantage of economy and secures proportional representation.

REPRESENTATION. In law, a statement or assertion as to some matter of fact. Representations have significance in a legal sense when they are acted upon. Such representations may be made as the basis of numerous legal transactions. See DECEIT; FRAUD; CAVEAT EMPTOR; CONDITION; SALE; WARRANTY, etc.

In the law of inheritance the term representation is also used to denote the principle upon which the issue of a deceased person take or inherit the share of an estate which their immediate ancestor would have inherited had he been living. Thus if one dies leaving two children and the children of a deceased child surviving him, the children will each inherit one-third of the real estate of the deceased and the other third will go to the children of the deceased child who are said to take by representation. See ADMINISTRATION (in Law).

REPRESENTATIVES, HOUSE OF. The Lower House of the Congress of the United States. See UNITED STATES; CONGRESS; COMMITTEES.

REPRIEVE (doublet of *reprove*, from OF. *reprover*, *reprouver*, Fr. *réprouver*, to reprove, reject, from Lat. *reprobare*, to condemn, reject, from *re-*, back again, anew + *probare*, to test, prove, from *probus*, good). The temporary suspension of a sentence for a crime, granted by the pardoning power, which is usually the chief magistrate of a State or nation. The term is most commonly employed to denote a stay of execution of a person convicted of a capital crime. Reprieves are usually granted in order to allow an investigation into the legality of the conviction, or into alleged 'newly discovered evidence' in favor of the condemned person. They are also granted in case of pregnancy of a woman condemned to death, in cases of alleged insanity after condemnation to death, and often pending an investigation of facts urged in an application for a pardon. See PARDON.

REPRISAL (OF. *represaille*, Fr. *représaille*, from *reprise*, prize, a taking, from *repris*, p.p. of *reprendre*, to retake, from Lat. *reprehendere*, *reprendere*, to recover back, blame, from *re-*, back again, anew + *prehendere*, *prendere*, to take). In international law, a means of securing redress without resort to war, but at the same time with the use of force. It consists in forcibly seizing from an offending nation property or its equivalent belonging to the aggrieved nation, or in detaining the property of an adversary with the intention of compelling it to afford the necessary redress. Reprisal is resorted to when a specific wrong has been committed and the seizure is by way of compensation in value for the wrong. The things seized are held subject to the termination of the controversy and are restored if the controversy is amicably settled. Reprisal is an act of retaliation and consists in applying to the subjects of an offending State treatment analogous to that which the subjects of the offended State have received. A reprisal, though an act of war in fact, is not such in intent, and, indeed, is resorted to as a means of avoiding war by securing redress without resort to the graver alternative, although it may constitute a sufficient cause of war. The forms of reprisal most commonly employed in recent times consist in placing an embargo on such ships of the offending State as may be lying in the harbors of the aggrieved State, or in the seizure of its ships

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at sea or of any property within the jurisdiction of the State, whether belonging to the State or to private citizens. Bluntschli mentions in addition the following acts of reprisal as permissible by the law of nations: interruption of means of communication, detention of subjects of the offending State as hostages, the expulsion or imprisonment of its subjects, refusal to be bound by treaty stipulations or other international agreements, and the withdrawal of privileges and protection to the subjects of the offending State. See RETORSION.

REPRODUCTION (from Lat. *re-*, back again, anew + *producere*, to produce, from *pro*, before + *ducere*, to lead). The fundamental property of the organic world essential in repairing losses by death and in maintaining the earth's population. Although at the outset the result of unknown causes, it consists in a separation of a part of the body of an individual from the parent body; division of a one-celled organism into two; or a giving off of an egg-cell or sperm-cell from the parent. (See CELL; MITOSIS.) Reproduction and growth are inseparable, and the former is the result of growth. As Verworn states, the general process that constitutes growth is an increase of living substance, and the essence of reproduction likewise consists merely in an increase of living substance. Reproduction differs from growth in that a part of the substance separates from the original organism. If the quantity of the living substance increases further by growth, this results in a "growth beyond the measure of the individual," and the cell must divide, i.e. reproduce. The different forms of reproduction are: (1) Self-division, secondary forms of which are (a) fission, and (b) budding or gemmation; (2) conjugation; (3) sexual reproduction.

REPRODUCTION BY CELL DIVISION. This is the primary mode of reproduction. While that of plant and animal cells is called 'cell division,' that of the entire one-celled plant or animal is called 'self-division.' This has been observed in the amœba and other Protozoa, as well as in the white corpuscles of the blood (leucocytes). See AMŒBA.

FISSION. Many of the lower invertebrate animals multiply by fission or budding. In fission the body, as in certain planarian and annelid worms, after having reached a certain size but not sexual maturity by ordinary cell division, is constricted into two or more parts. Each of these several parts separates and regenerates itself into an independent perfect worm. Fission or self-division occurs in fully grown examples of many-celled animals, as in certain polyps and starfish.

BUDDING OR GEMMATION. The process of reproducing the persons of a compound individual or colony. Buds are outgrowths of a parent person that enlarge while in connection with the parent to form a new person. In the case of budding the products are unequal. All the higher plants are produced by budding and are colonies. Among animals the process occurs in Protozoa, sponges, cœlenterates, polyzoans, and tunicates. According to one view the tapeworm is a colony whose parts are produced by budding; even segments or rings of an annelid have been considered as produced by budding. Indeed, as there is no sharp line drawn between growth of the simple individual and growth of a compound individual, so no sharp line exists between ordinary development and budding; nor is there any definite distinction between cell division and division in the amœba, and budding. This is seen in examples of terminal budding, when the buds appear at the end of the main axis of the parent organism, as in plants and certain Protozoa and low multicellular animals.

CONJUGATION. Though an anticipation of sexual reproduction, conjugation radically differs from it in the fact that two conjugating bodies are each an entire plant or animal. It occurs in the unicellular plants, such as diatoms and desmids, and in the Infusoria. Thus in the act of conjugation of a monad-like form (Heteromita) a free-swimming individual approaches an anchored form, the posterior ends coming in contact; they then fuse like two drops of syrup, the nuclei sharing in the fusion. The product swims around freely, then rests, loses its flagella, and becomes encysted, then bursts open at three angles of the cyst, pouring out a swarm of spores as the result of multiple internal fission. It is usually among the Infusoria a temporary process, but in Vorticella the fusion is permanent. The result of conjugation upon the species is to prevent its deterioration. It is a process of rejuvenation, comparable with the intercrossing of higher plants and animals.

SEXUAL REPRODUCTION. In the process, sometimes called 'amphigony,' of reproduction by means of sexual cells, two animals, the male and female, secrete in reproductive glands, one eggs, the other spermatozoa, the result being their union and the formation of a new individual. Here still more than in conjugation sexual reproduction results in a complete renewal or rejuvenescence of the organism. In those plants and animals which also reproduce by budding sexual reproduction arrests degeneration by the introduction of new blood. Sexual reproduction in animals is essentially the same in all classes above the Protozoa. There is a series of developmental processes embraced under the following heads: (1) Maturation of the egg; (2) the process of fertilization; (3) a process of cleavage or segmentation of the yolk (see MITOSIS); and (4) formation of the three germ layers. (See EMBRYOLOGY.) The essential phenomenon in the reproduction of the many-celled animals, i.e. all above the Protozoa, is the act of fertilization or impregnation of the egg. This is effected by the entrance of a single spermatozoön into the egg. After the spermatozoön has entered the egg the head and middle portion, which contains the body called the *centrosome*, can still be recognized as the chromatic and achromatic parts of the spermatozoön or sperm nucleus (male pronucleus). In the protoplasm of the egg (that enveloping the nucleus and called *cytoplasm*) the centrosome of the sperm nucleus gives rise to rays forming 'asters.' (See MITOSIS.) Preceded by these rays, the sperm nucleus travels toward the egg nucleus until it reaches and fuses with it to form a single cleavage nucleus. Then the centrosome divides into two, which migrate to opposite poles of the nucleus, while the cleavage nucleus changes to a cleavage spindle, which divides and thus initiates the embryonic development, the process being called cleavage or segmentation. At this point fertilization is complete (Hertwig). It also appears that of the chromatin particles

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(chromosomes) in the newly formed nucleus of the fertilized egg, exactly one-half of the number are furnished by the egg nucleus and the other half by the sperm nucleus. These chromosomes are regarded as the bearers of heredity, forming the physical basis of heredity. See HEREDITY.

ASEXUAL AND UNUSUAL MODES OF REPRODUCTION. Budding and its various forms are examples of asexual reproduction. In certain insects and other animals the egg develops and gives rise to a mature individual without fertilization. (See ALTERNATION OF GENERATIONS; PARTHENOGENESIS.) Hertwig calls this sexual reproduction with degenerated fertilization. Different modes of reproduction (asexual, sexual, parthenogenesis, pædogenesis) may occur in the same species. The alternation of parthenogenesis with pronounced sexual reproduction is called 'alternation of generations,' or heterogony.

Consult: Hertwig, *The Cell* (New York, 1895); id., *Zoölogy* (ib., 1902); Wilson, *The Cell in Development and Inheritance* (ib., 1897).

REPRODUCTION (in plants). Although reproduction is a physiological phenomenon, it

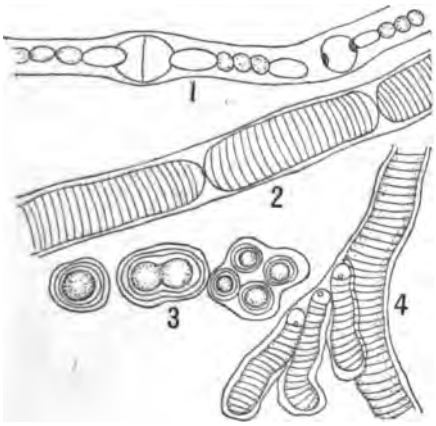

FIG. 1. VEGETATIVE REPRODUCTION.

1. Nostoc filament breaking into colonies; 2, Oscillatoria filament breaking up; 3, Glœocapsa forming new individuals by dividing; 4, Calothrix dividing by false branches.

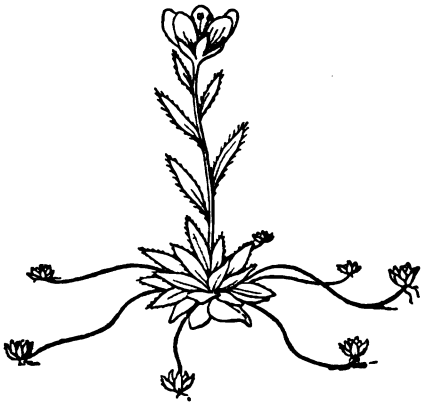

FIG. 2. VEGETATIVE REPRODUCTION IN A SAXIFRAGE.

Stolons are put forth, upon which there arise buds, capable of developing into plants like the parent.

is also a prominent morphological phenomenon in so far as it involves important structures. The physiological aspects are essentially the same as in animals; the morphological aspect, however, deals with structures peculiar to plants. Two types of reproduction are recognized among plants, namely, *vegetative multiplication* and *reproduction by spores.*

(1) VEGETATIVE MULTIPLICATION. In this case the ordinary vegetative cells are used in reproduction. (Figs. 1, 2.) In the simplest plants the adult body consists of a single vegetative cell, and when this cell divides two new

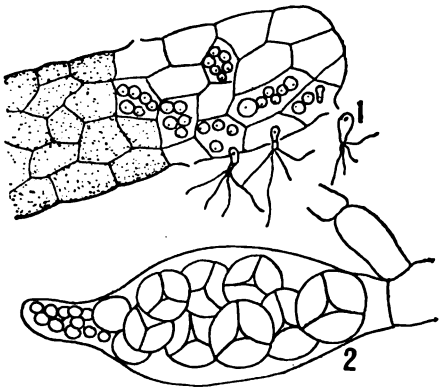

FIG. 3. ASEXUAL REPRODUCTION.

1, Tip of a green alga, showing swimming spores formed in ordinary cells and discharged; 2, branch of a red alga, containing tetraspores.

plants are produced. The same power of cell division persists in all plants, but in the complex (many-celled) plants much of it results, not in reproduction, but in the growth of the body. In such plants, however, the power of vegetative multiplication continues, as when

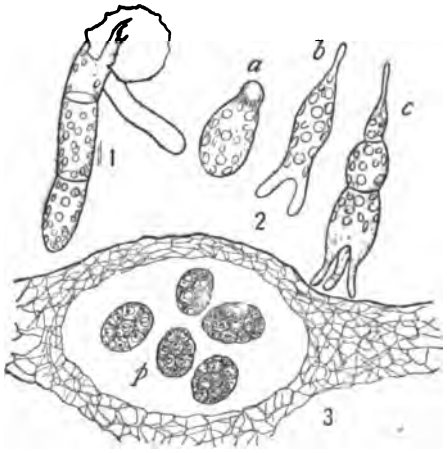

FIG. 4. ASEXUAL REPRODUCTION.

1, A fern spore germinating; 2, a, b, c, three stages in germination from the spore of an alga; 3, spores (*p*) germinating within a spore-case.

new potato plants come from tubers (modified stems), or new grapevines from cuttings, or new begonias from pieces of a leaf, or when buds from one plant are grafted into the stem of another. In fact, vegetative multiplication is very conspicuous in most plants, enabling them to spread with comparative rapidity, as the strawberry spreads by means of its runners, or the couch grass by its rootstocks (underground stems).

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(2) REPRODUCTION BY SPORES. A spore, in general, is a single cell designed for reproduction and separated from the parent plant. There are two great classes of spores differing not in function, but in origin: (a) *Asexual spores* (Figs. 3-5) are usually formed by the division of the contents of a mother cell (sporangium), although

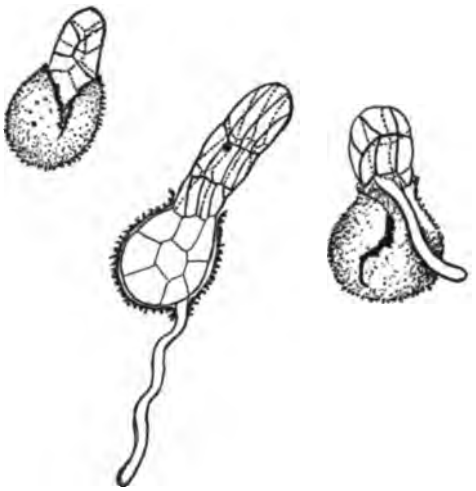

FIG. 5. ASEXUAL REPRODUCTION.
Germinating spores of a liver-wort.

they are sometimes formed free by cell division at the tip of a special cell or filament. In many cases spores are provided with cilia and can swim freely in water; in others they are light and dry, and are carried by the wind. They are the most primitive spores, and are the only kind produced by many low plants; but they are retained even

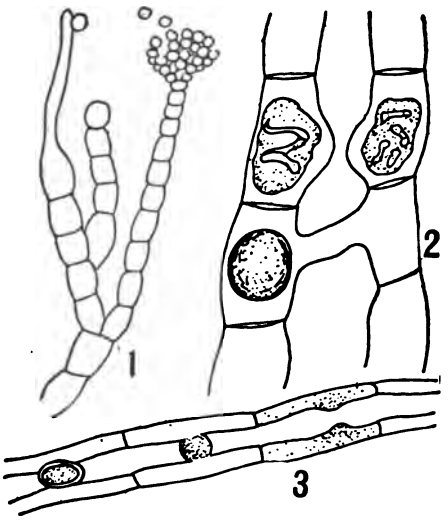

FIG. 6. SEXUAL REPRODUCTION.
1, Red alga, with male cells, one of which is attached to trichogyne of the female organ; 2, conjugation of Spirogyra; 3, conjugation of Mongeotia.

by the highest plants, the pollen of flowering plants being an illustration. (See SPORE.) (b) *Sexual spores* (Figs. 6-8) are formed by the union of two sexual cells (gametes). In the first appearance of sex the pairing gametes are alike (see the article SEX) and the fusing process (conjugation) results in a sexual spore (zygospore or zygote). When the gametes become differentiated into sperm and egg, as in all the higher plants, the fusing process is called fertili-

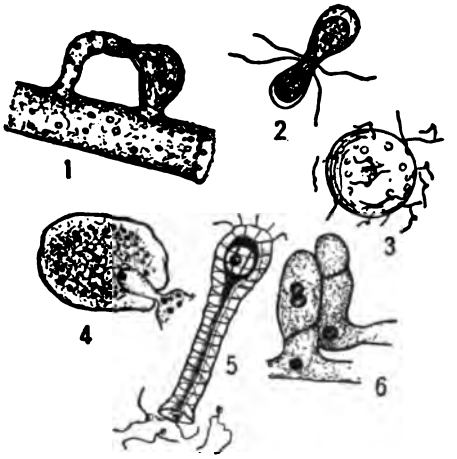

FIG. 7. SEXUAL REPRODUCTION.
1, Antheridium and oögonium of Vaucheria; 2, conjugation of gametes; 3, egg and sperms of a seaweed; 4, antheridium and oögonium of a fungus; 5, archegonium of liverwort, with sperms entering neck; 6, fusing sexual cells of a fungus.

zation, and the resulting sexual spore an oöspore or fertilized egg. It is evident, therefore, that in most plants there coexist three means of reproduction, namely, vegetative multiplication, asex-

FIG. 8. SEXUAL REPRODUCTION.
Double fertilization in lily, showing one sperm uniting with egg (*a*), and the other with the polar nuclei (*b*). See FERTILIZATION.

ual spores, and sexual spores, which are used under varying conditions, and reinforce one another in the general work of producing new plants.

REPRODUCTION OF IDEAS. It is customary to divide the 'act of remembering' into three parts: retention, reproduction, and recognition. (See MEMORY; RETENTION; RECOGNITION.) The reproductive aspect of memory refers to (1) the excitation of a brain-tract that has received a functional modification by previous excitation.

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and (2) the appearance of the corresponding mental processes. The word 'reproduction' is misleading. First, because it implies the 'reappearance' of mental experiences which have persisted and have maintained their identity during their absence from consciousness. An examination of the processes of retention does not warrant the implication. Secondly, reproduction is often posited where no explicit reference is made to a past event at all. Thirdly, a 'reproduced' image is usually schematic; i.e. it contains only the outlines or salient features of its counterpart. The sole definite meaning left for the term 'reproduction' is the unequivocal appearance of 'revived' sensations; i.e. of centrally aroused sensations which possess the function of referring directly to a definite period of past experience. Even when it is thus taken, the concept must not be confused with the old 'copy' theory, which made ideas weaker duplicates of sensations.

The conditions under which reproduction of ideas takes place are various. In the associational psychology, the single condition of reproduction was said to be association. Ideas were 'called forth' by the magic of association. If, however, we conceive association to mean certain conscious complexes themselves, and not their cause, we cannot say that it *conditions* reproduction. (See ASSOCIATION OF IDEAS.) Association and reproduction will have a *common* cause. The 'law' of association will be, i.e., a law of reproduction and will be stated in terms of cerebral connections. This general statement does not help us, however, to name the incentives to the reproduction of any particular set of processes. For this, we must take into account the functions of attention, feeling, will, and mental constitution (e.g. one is apt to 'reproduce' visual imagery if one's attention is directed to visual things, or if one is visually-minded, or if one's mood fits in with some particular scene), and the special conditions which are enumerated under association—frequency, recency, vividness, etc.—i.e. the proximate conditions which determine the relative liability of reproduction of ideas.

Finally, a comparison of peripherally initiated sensations with the 'reproduced' sensations contained in imagery makes it possible to measure both the power of reproduction and the fidelity with which sensations aroused without the co-operation of the sensory organs represent their 'originals.'

BIBLIOGRAPHY. Külpe, *Outlines of Psychology* (New York, 1895); Ward, *Mind, N. S.*, ii., iii. (London, 1893-94); Bradley, *Principles of Logic*, Bk. ii. (London, 1883). See authorities referred to under MEMORY; RETENTION; IMAGINATION; ASSOCIATION OF IDEAS, and for reproduction as an experimental method, see MEMORY.

REPRODUCTIVE SYSTEM, COMPARATIVE ANATOMY OF. The germ cells are not the only ones that are capable of increasing their numbers. This is a common property of all body-tissue cells, and by virtue of this fact the number of individuals may be increased by division of the body and subsequent regeneration (q.v.). In Infusoria no specialized reproductive organs are present. When the unicellular organism exceeds its size-limit, it divides into two parts or 'daughter cells.' (See REPRODUCTION; FISSION.) Reproduction of sponges is either asexual or sexual. Asexual reproduction, or budding, may occur externally or internally. The sexual reproduction may be hermaphroditic or diœcious. Cœlenterates are, for the most part, sexually separate, but some are hermaphrodites, as Ctenophora. There are no organs for the transmission of the sexual products to the exterior.

Sexual ducts occur for the first time in flatworms. In some the entire ovary produces eggs, while in other forms a part of the ovarian cell only produces egg cells and the rest, the 'vitellaria,' is so modified that it produces only yolk. Both the female and the male glands communicate with the exterior by ducts leading to the copulatory apparatus. The sexes are almost always separate in echinoderms. In one group (Synapta) of the holothurians hermaphroditism is frequent. There are no copulatory organs nor accessory glands. The general organs of starfishes develop in five pairs of bundles. One pair lies in each arm and each pair opens dorsally to the exterior by a separate opening.

In the mollusks the generative apparatus is composed of germ glands, ducts, and copulatory organs. The sexes are separate throughout the whole phylum. Hermaphroditism is, however, wide-spread. In nearly all cases of hermaphroditism both kinds of sexual products are produced in the same gland. The gonads either have separate ducts or utilize the nephridia. The genital glands open either (1) into the pericardium, (2) into some part of the kidney or uterus, (3) into the cloaca, or (4) directly to the exterior. When there are separate ducts they may be very complicated in structure. The structure of the copulatory organ and the form of the ducts with their accessory glands and tubules vary much in detail in the different species. The sexes are distinct in many of the annelids, but Hirudinea, Oligochæta, and some others are exceptions. The sexes of Polychæta are separate with a very few exceptions. The ovaries or testes are segmentally repeated several or many times. The ripe eggs and sperm float in the cœlomic cavity, to be picked up and discharged to the exterior by the nephridia, or by nephridia specially modified into genital ducts.

The sexes are separate in Crustaceæ except in a few cases. The male and female sexual glands are constructed on the same plan and have a similar position in the body. There is only one pair, and in certain species only one gland. The parts that make up the sexual apparatus are as follows: (1) The genital organs (ovaries and testes); (2) ducts (oviducts, vasa deferentia); (3) terminal parts (vulva, vagina, and receptaculum seminis in the female, and ductus ejaculatorus in the male); (4) outer copulatory organs. Except in Cladocera and some Copepoda the genital apertures are situated on the ventral side. In all hexapods they open at the end of the abdomen. In certain species there are glands whose secretion unites the sperm cells into capsules or spermatophores. A penis may also be present. The female apparatus may possess a receptacle for the penis and another for storing the sperm. The testis and ovaries consist of a varying number of long tubes which together enter the vas deferens or oviduct. The ovarian tubes are of two kinds, those with and those without nutritive cells. The nutritive cells may alternate with the egg cells or they may be collected in a bunch and furnish nutritive material to the egg cells by means of fine constricting strands. Coming to

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the Chordata, we find that in Balanoglossus the sexes are separate, and the ovaries and testes are a row of sacular organs which open to the exterior by a series of pores, or, in the American species, by rupture. Tunicates are hermaphroditic.

In Amphioxus the sexes are separate. The sexual organs are horseshoe-shaped sacs which lie in 26 pairs and without ducts. The ova and spermatozoa burst the atrial cavity and reach the exterior by means of the atropore. The sexes of the lamprey are separate and the sexual organ is unpaired. The sexual products pass into the body cavity and thence to the exterior by two pores into the urinogenital sinus. There is a penis in the male.

In fishes, impregnation is internal in all the sharks except the Greenland shark. The claspers act as intromittent organs. With a few exceptions, such as the dogfish, there are two ovaries and the oviducts are separate from the ovaries. The oviducts, the Müllerian ducts, are united anteriorly and open into the body cavity. The eggs are extruded into the body cavity and then pass into the oviducts. There is a large shell gland in the oviduct. The majority of fishes lay eggs that are fertilized outside the body. Most sharks and a few teleosts are viviparous, the eggs being hatched in the oviduct or ovary. In two of the sharks the yolk-sac and the wall of the oviduct are united, suggesting the placenta of mammals. The ovaries of teleosts are continued backward into a duct. Posteriorly the two ducts fuse. The oviducts of the Dipnoi are somewhat coiled, like those found in Amphibia; each connects with the body cavity near the pericardium by means of a funnel-shaped aperture. Hermaphroditism is not uncommon throughout the Teleostei.

Reptiles and Birds. The ovaries are broad in the turtles, and long and narrow in snakes and elongated lizards. The ovaries are usually asymmetrical. Only the left ovary is completely developed in birds. The oviducts open into the abdominal cavity by wide funnel-shaped apertures and in the walls of the ducts are glands for the formation of albumen and egg-shells. The ovaries, like the testes, increase in size during the breeding season. In birds the vas deferens, like the ovaries, opens into the cloaca by an independent aperture. In lizards it fuses with the ureter. There is a copulatory organ in reptiles; in birds it exists only in the ducks, geese, and Ratitæ.

The genital apparatus of mammals lies in the lumbar and pelvic regions. When the ova are mature they pass into the body cavity or are immediately caught up by the funnel-shaped opening of the oviducts. This portion is known as the Fallopian tubes. In the majority of mammals the oviducts fuse behind the Fallopian tubes to form the uterus. It is in the uterus that the ova attach themselves to the maternal tissue and develop. The fused region behind the uterus is known as the vagina. In monotremes the Müllerian duct remains distinct and there is a cloaca. In marsupials the Müllerian duct begins to fuse to form a vagina. In most other mammals an anterior fusion of the two parts of the uterus occurs. The degree of fusion varies in different species. In Primates the only evidence of the paired origin is seen in the Fallopian tubes. The testes of mammals develop in the same position as the ovaries, but they later pass out of the abdominal cavity through an opening in the latter known as the inguinal canal, and descend into the scrotal sacs; but in many mammals the testes remain permanently in the abdomen.

External genital apparatus exists as follows: In elasmobranchs there are male 'claspers' which are inserted into the cloaca and oviduct of the female. In connection with them there is a gland which is histologically much like the uropygial glands of birds. In Amphibia the male of Gymnophiona alone possesses an eversible cloaca. In lizards and snakes there are two erectile penes outside the cloaca. Each is furrowed. Organs of similar nature, but much less developed, occur in the female. Chelonians and crocodiles have a copulatory organ united with the ventral wall of the cloaca. It is made up of two fibrous fused masses, and, as in the above copulatory organs, is regulated by well-developed muscles. There is a furrow on its surface. The female also has a median, less well developed organ of the same character. In most Ratitæ and some Carinatæ there is an eversible tube strengthened by two fibrous bodies. When at rest it is coiled up in the left side of the cloaca. The copulatory organ of monotremes lies between the urinogenital sinus and the cloaca, and is fused with the ventral wall of the latter. In all other mammals the organ arises on the ventral wall of the cloaca. In the female it is channeled. In the male the groove is closed to form a canal. Three bodies of erectile tissue are developed in connection with the penis of man. The greater part of one of these glands occurs at the apex of the penis and is known as the glans penis. The clitoris of the female is the homologue of the male penis.

Consult: Lang, *Text-Book of Comparative Anatomy* (London, 1891-96); Wiedersheim, adapted by W. N. Parker, *Comparative Anatomy of Vertebrates* (London, 2d ed., 1897).

REPTILE (Lat. *reptile*, neu. sg., sc. *animal*, animal, from *reptilis*, crawling, from *repere*, to crawl; connected with *serpere*, Gk. *ἕρπειν*, *herpein*, Skt. *sarp*, to creep). A cold-blooded vertebrate animal of the class Reptilia, breathing by lungs and having a single median occipital condyle. In their larger, phylogenetic relationships, reptiles occupy a central position, but are closely in affinity with birds, so that the two classes were united by Huxley into a group, Sauropsida, in distinction from the Mammalia and from the Ichthyopsida, or amphibians and fishes. "On the one hand," Gadow asserts of the reptiles, "there is not the slightest doubt that they are evolved from some branch of the Stegacephali, whilst on the other hand the reptiles, probably through some branch of the Theromorpha, have given rise to the mammals; some other reptilian branch, at present unknown, has blossomed out into the birds."

Classification. The history of the development of the ideas on the classification of reptiles is given under Herpetology (q.v.). The arrangement by Parker and Haswell is as follows:

Class Reptilia:

Order I. Squamata.—This includes the Lacertilia (lizards), Ophidia (serpents), and Pythonomorpha (extinct snake-shaped forms, with paddle-like limbs and lizard-like skulls).

Order II. Rhyncocephalia.—Lizard-like reptiles, often huge, scaly, with walking limbs; vertebræ amphicœlous; sacrum composed of two

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vertebræ; teeth acrodont. This order has one living genus (Sphenodon).

Order III. Chelonia—The turtles (q.v.).

Order IV. Theromorpha.—Sacrum composed of six vertebræ, limbs adapted for walking, four suborders: Anomodontia, Placodontia, Pareiasauria, Theriodontia—all extinct.

Order V. Crocodilia.—Crocodiles and alligators.

Order VI. Sauropterygia.—Extinct aquatic reptiles with a very small head, elongated neck, limbs usually flipper-like, and teeth in separate sockets.

Order VII. Ichthyopterygia.—Extinct aquatic reptiles with large head, no neck, long tail, flipper-like limbs, naked skin, and teeth lodged in a groove.

Order VIII. Dinosauria.—Extinct terrestrial reptiles, skin naked or armored, pelvis bird-like, teeth in sockets. See DINOSAURIA.

Order IX. Pterosauria (pterodactyls).—Extinct aerial reptiles, with long neck, sacrum composed of two or three vertebræ, skull bird-like, sternum present, fore limbs wing-like, and teeth in sockets.

An advance upon this, resulting from larger knowledge of fossil forms, has been educed by Boulanger and Gadow, so that the most complete classification now stands as follows:

Class REPTILIA:

Sub-Class I. *Proreptilia.*

Sub-Class II. *Prosauria.*—Orders: Microsauri, Prosauri.

Sub-Class III. *Theromorpha.*—Orders: Pareiasauria, Theriodontia, Anomodontia, Placodontia.

Sub-Class IV. *Chelonia.*—Orders: Athecæ, Thecophora.

Sub-Class V. *Dinosauria.*—Orders: Sauropoda, Theropoda, Orthopoda, Ceratopsia.

Sub-Class VI. *Crocodilia.*—Orders: Pseudosuchia, Parasuchia, Eusuchia.

Sub-Class VII. *Plesiosauria.*—Orders: Nothosauri, Plesiosauri.

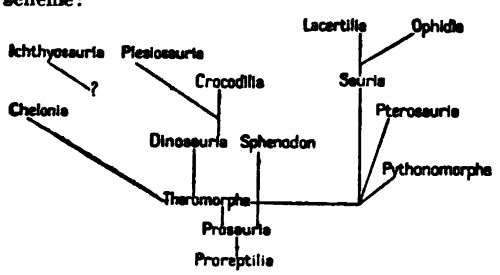
Sub-Class VIII. *Ichthyosauria.*

Sub-Class IX. *Pterosauria.*

Sub-Class X. *Pythonomorpha.*—Orders: Dolichosauri, Mosasauri.

Sub-Class XI. *Sauria.*—Orders: Lacertilia, Ophidia.

The term sub-class is given to the larger subdivisions "to emphasize the fact," says Gadow, "that these reptilian groups are of undeniably greater morphological value than those which are generally called 'orders' in the Mammalia." This author tries to display their supposed evolutionary phylogenetic relations by the following scheme:



The earliest fossil reptiles are found in the Permian age. Reptiles attained their highest development in Jurassic and Cretaceous times, when many were of gigantic proportions, and ruled the world. Since then the order has waned, only the recent and adaptive line of snakes seeming to flourish and promise continued prosperity at the present time.

CHARACTERISTICS. With the exception of modern chelonians and ancient dinosaurs, the reptiles in general are of an elongated form, the body being often nearly cylindrical and usually terminating in a very long tail. In a considerable number (as most serpents and some lizards) no traces of limbs are apparent; in some (as certain lizards) the limbs are rudimentary; while in the remainder the limbs are fully developed, although the feet rarely suffice to keep the belly from the ground. The feet are of the pentadactyl type, but not always five-toed.

The covering of the body presents several well-marked varieties. In a few of the lizards the skin is covered with regular scales, composed of a mixture of bony and horny matter, and lying over each other like those of fishes; in most lizards and in serpents scales and plates are developed on the surface of the corium or true skin, and covered over with epidermis, which is thrown off at intervals, the molt forming an accurate cast of the body of the animal; while in the crocodiles and tortoises the scales are converted into true bony plates, which in the former are imbedded in the tissue of the skin, and in the latter are united with the ribs, sternum, and other bones of the internal skeleton, to form the complete bony case into which the head and limbs of the animal can usually be retracted. See SKELETON, paragraph *Exoskeleton.*

The skeleton is completely ossified in all reptiles. The skull is small, loosely united, and articulates with the atlas, as in birds, by one condyle, which is formed mainly by the basioccipital. There is an auditory columellar apparatus within the fenestra ovalis, as in Amphibia. The mandibles consist of many pieces, and articulate with the cranium through quadrate bones—one of the principal characters separating this class from the mammals.

The mouth, except in the chelonians, is usually provided with conical teeth, adapted rather for seizing and holding prey than for dividing and masticating food. These teeth, like those of fishes, are successional; that is to say, new teeth are being constantly developed, while the older ones are regularly shed. (See CROCODILE.) In some instances the teeth are attached solely to the jaws, while in others they are also attached to the pterygoid or palate bones. In chelonians the teeth are replaced by a horny beak, which, according to the habits of the animal, is adapted for bruising as well as cutting, and which in some species constitutes a somewhat formidable weapon.

The vertebræ, like those of other Amniota, are 'gastrocentrous,' that is, their centra "are formed by the pairs of intercentralia, while the basicentralia are reduced" or lost altogether; this characteristic separates reptiles wholly from amphibians. The total number is often great, especially in serpents and the tail of the lizards. The ribs form a true sternum, and the ilio-sacral connection is post-acetabular; the former of these characters separates reptiles from amphibians and the latter from mammals. Reptiles are mainly carnivorous, and swallow their prey whole. Hence the

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jaws are adapted, by their mobility and subdivision into segments, to open very widely, and the œsophagus is capable of great dilatation. The tongue is commonly free, elongated, and bifid, except in the crocodiles, in which it is immovable, whence the popular idea that these animals do not possess this organ. The stomach is sometimes scarcely larger than the œsophagus and intestines (as in serpents), while in other cases it forms a sac of considerable size. In either case it is capable of great dilatation. A liver, pancreas, and spleen are always present, the two former pouring their secretions into the upper part of the intestine, which is short, wide, and not much twisted, and divided into two portions, corresponding to the small and large intestines of mammals, by a valve. It finally terminates in a wide cloaca, into which the ducts of the urinary and generative organs usually open. The kidneys differ from those of amphibians, and agree with those of birds, in having no nephrostomes, and in having each its one separate ureter. See ALIMENTARY SYSTEM, EVOLUTION OF.

Reptiles breathe air only by means of lungs, and never have gills even during embryonic life. The lungs are usually of large size; but as they are not subdivided, as in mammals and birds, into innumerable microscopic air-cells, the real aerating surface is comparatively small. In several groups they are merely capacious bags, whose vascular or aerating surface is but slightly increased by sacculi developed in their cells. In serpents one lung (usually the right one) is of extraordinary length, while the other remains altogether rudimentary. This inferiority of the respiratory apparatus of reptiles is further shown in the absence of those means for the continuous introduction and expulsion of air possessed by birds, and still more by mammals. See RESPIRATORY SYSTEM, COMPARATIVE ANATOMY OF.

This feeble respiratory system is correlated with the absence of any covering, such as hair or feathers, which might retain the bodily heat generated by the oxygenation of the blood, as is the case in the well-clothed birds and mammals; hence the blood remains at a temperature little above that of the air or water in which these animals live, and reptiles are placed with the similarly naked or scaly amphibians and fishes as 'poikilothermous' or 'cold-blooded.' (See ANIMAL HEAT.) The heart, unlike that of a bird or mammal, is divided into two atria, and an imperfectly divided ventricle; it has no conus, but semilunar valves exist at the base of the tripartite aortic trunk; the right and left aortic arches are complete and remain functional. The red corpuscles of the blood are nucleated, biconvex and oval—a point of distinction from mammals.

The brain and nervous system present no peculiarities calling for special remark; the presence of an intercranial hypoglossal nerve separates this class from the amphibia. The organs of the senses are well developed, but there are no lateral sense organs. No reptiles have external ears, but their hearing is good. See NERVOUS SYSTEM, EVOLUTION OF.

The sexes are always separate; and the male generative organs, which are far more highly developed than in amphibians, present peculiarities which, in association with the position of the anal aperture, have been adopted by zoölogists as a basis of classification of special taxonomic value among the Ophidia. Fertilization is i ternal, and most reptiles lay merobl from which the young hatch quickly influence of the warmth derived from th or decaying vegetation in which they are the mother, or, in a very few cases, by h tion. The eggs are comparatively few (the turtle tribe), and relatively large, c a large quantity of food-yolk, so that t are able to take care of themselves the they emerge; yet in most cases they rece parental care. The integument of the parchment-like, containing little lime, color is always white. Certain reptiles, retain their ova in a sort of uterine cavity by a dilatation of the oviduct near its terr in the cloaca, until the development of bryo is so far advanced that the envelopi brane bursts previously to the expulsion ovum, so that the young are actually born a mode of generation to which the term 'o arous' is applied. An amnion and an a are formed in the process of development, reptiles with birds and mammals. See DUCTIVE SYSTEM, COMPARATIVE ANATOMY O

In past times reptiles have dominat earth, swarming in the seas, along the sho the land, and in the air. They reached hug and many were herbivorous, and preyed u others which, as they increased in size and must have been the principal active agency extermination of the fishes, amphibians and cuttlefishes, which previous to the Mesozoi were the dominant animals of the earth. T terations of physical conditions, which see have progressed steadily during the Mes Age, toward dryness and coolness in the at phere, as well as toward elevation and d age of the land, and the gradual inc of density (salinity) in the sea, were prob unfavorable to the reptilian forms of that t both directly and indirectly, by being likewise favorable to the creatures upon which they On the other hand, the growing clarification of atmosphere consequent upon the draining and vation of the land and the spread of terrest vegetation, which subtracted its excess of carb acid gas and contributed a larger amount oxygen, stimulated the development of super types which began in the Permian and slo won their way in competition with the dinos rian and other reptiles of their day until th finally overcame them in importance. That th were enabled to do so was due principally, doubt, to their warmer covering (feathers a hair), enabling them to retain bodily heat, whi gave them greater endurance of famine and c matic adversities, and promoted activity, whic in turn, reacted to stimulate and develop all th bodily parts and functions. At any rate the rep tiles have steadily declined, many of thei branches have become extinct, and others are ap proaching that end, while all have been driven b competition to the holes and corners of the world, to hiding in swamps, or amid loose rocks, or in hollow trees or among their leafy tops—places where their many enemies cannot easily get at them. Only the heavily armored turtles and crocodiles are able to survive freely in the water, land-tortoises existing only by being very small, well protected, and secretive; and lizards only by having diminished to small size and acquired

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great agility. The only branch of the class that seems to be prosperous is that of the snakes, whose peculiar form, adaptive qualities, and excellent endowments for escape or defense enable them to fill a peculiar and little-contested place in the economy of the world.

FOSSIL FORMS. The living reptiles are comparatively insignificant survivors of a mighty race, whose first appearance antedates the Permian period, since remains of two widely dissimilar groups occur in Permian rocks in Europe, North America, and South Africa. First becoming abundant in the Triassic, the rise of reptiles is coincident with the decadence of the Stegocephalia, the great armored amphibians. In the Jurassic the development of reptiles attained its highest level; they dominated land, sea, and air in forms as grotesque as the mythical griffon, dragon, and sea-serpent. It is noteworthy that the Mesozoic reptiles paralleled nearly all the adaptations which occurred ages later among the mammals. There were land reptiles of carnivorous habit, like the cats and wolves, heavy sluggish animals adapted to vegetable feeding, marine fish-like forms which strongly suggest the whales and porpoises, others which sat erect on the hind legs and tail, in some cases adapted to leaping like the kangaroo, and even 'dragons of the air' with bat-like wings. The supremacy of the reptiles extends into the Cretaceous with scarcely any diminution; in fact, it is here that several orders reach their culminating point; but toward the end of this period the dynasty of reptiles comes to an end, and at the dawn of the Eocene the mammals, which during the Mesozoic were extremely insignificant, become the reigning type.

Geographically, the reptilian fauna of the Mesozoic period was almost cosmopolitan, although the contemporary faunas of widely separated regions sometimes show considerable dissimilarity. This variation may be due to different climatic conditions, or to causes which prevent migration of animals. Regarding the general geological distribution of reptiles, it may be stated that the Karoo formations (chiefly Lower Triassic) of South Africa have yielded the anomodont land reptiles in remarkable numbers and diversity of form, while the Middle Trias and the Jurassic of Europe are especially rich in marine forms. Above the Triassic no land-reptiles are known for the Southern Hemisphere, the anomodonts having become extinct, but the northern continents, and especially North America, witnessed during the Jurassic and Cretaceous the development to gigantic size of ichthyosaurs, plesiosaurs, turtles, and especially dinosaurs. The pterodactyls attain huge proportions in the American Cretaceous, and here for the first time appear the great sea-lizards or mosasaurs. It is certain that the true lizards, and probably snakes, existed in the Cretaceous, but as yet only a few doubtful remains have been discovered below the Eocene. None of the reptilian orders except those which exist at the present survived the Cretaceous, and the beginning of the Eocene witnessed a reptilian fauna essentially similar to that of to-day.

The origin of reptiles from stegocephalian Amphibia cannot be doubted; and as the earliest known reptile, palæohatteria, from the Lower Permian of Saxony, is already well differentiated from its stegocephalian contemporaries, it seems probable that reptiles existed as early as the Upper Carboniferous. Some of the Microsauria, a sub-order of stegocephalians, are ranked by Gadow as reptiles. It is not improbable that the reptiles arose diphyletically, or in two parallel lines, from the Amphibia, and as far back as the Permian we find the widely divergent stems of the two great divisions of the order. Of late years the diphyletic character of the class has been noted by several writers, but it was not until 1902 that the two branches of reptilian descent were clearly differentiated by Osborn as sub-classes, under the names *Synapsida* and *Diapsida*. These names refer to the condition of the temporal region of the skull—whether primitively a single temporal arch, or separate upper and lower arches.

See special articles elsewhere in this work under the names of groups above mentioned, as DINOSAURIA, ICHTHYOSAURUS, THEROMORPHA, etc.

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REPUBLIC. A form of political organization in which the principal agents of government are chosen by qualified electors, to whom they are, in theory at least, responsible. Such electors may comprise the whole adult population of the State, or all qualified male citizens, or a small group of persons exercising a constitutional or hereditary power of election. The earlier republics were of the latter sort, ranging from the free but limited democracy of Athens to the narrow oligarchies which divided the sovereignty of Italy during the Middle Ages. The democratic movement of the last century has, in the freer political communities of the Western world, largely substituted a popular for an oligarchical electorate, thus giving to the world republics of the type of France and the United States of America, and creating a new but inaccurate definition of republic as synonymous with popular government. See DEMOCRACY.

It is not to be denied that there may be a republic in reality which is not such in name, nor that a government which masquerades under republican forms may in fact be a thinly disguised monarchy or imperialism. In limiting the term republic to the form of government, we must be understood as speaking of the form through which government is actually administered. A monarchy in which the crown has become merely the symbol of social distinction and no longer represents political authority may fairly be described as a republic in all but name; while a military autocracy, like that of the Cæsars, though veiling its assumption of arbi-

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trary power under republican forms, is none the less a monarchy. That the English government is approximating to the former condition, and that the military despotisms of Central America are perilously near the latter, cannot be denied, though it would be rash to say that in either case the conversion of the government from the one type to the other has yet become complete.

It is to the growing realization of this fact—that a republican form of government furnishes no guarantee against tyranny, and that monarchy is not inconsistent with a high degree of political freedom—even more than to the conservative reaction of half a century ago, that we must attribute the change in the character and aims of the liberal movement of the last century. The widespread republican sentiment which in 1848 threatened the thrones of Continental Europe has completely died out, and in its stead we find a growing sentiment for the liberalization of the monarchical institutions which survived that revolution. England has taken the place of the United States and Switzerland as the model of political reformers, and the aim is rather to transform existing institutions than to abolish them and substitute others of the republican type.

Attempts have been made, but without much success, to classify republics according to the extent to which popular power was diffused through the mass of the people. A more valid and useful distinction among governments of the republican type is found in the form in which the popular choice, whether wide or narrow, expresses itself, and this is determined not so much by political theory as by considerations of practical convenience. From this point of view republics fall into two classes, the pure and the representative. The former, illustrated in the local town government of New England, as well as in the Athenian democracy and the early Swiss republics, was strictly a government of the people by the people, all the citizens—a small and select class in Athens, the whole body of freemen in Appenzell and Schwiz—actually taking part in the administration of the State. This form of government is, from the nature of the case, limited to small and compact communities, with simple and common interests, and does not lend itself to the solution of vast and complex problems of government. It is obviously unsuited to the great modern State, with its large population, varied interests, and extensive dominion. For a republic of this type there is no alternative but the adoption of the representative form of government. This is the indispensable condition of the existence of republics of the modern type.

Most of the leading writers on governments have treated the republic as a recurring but merely temporary stage in the cycle of political growth and decay, which moves from the stability of orderly monarchy, through oligarchy, democracy, and anarchy, back to despotism. But the conditions of modern life and the problems of modern government are so different from those of old that the reflections and prognostications of Aristotle, Polybius, Machiavelli, and Hobbes may safely be disregarded by us. What is certain is that democratic government everywhere, but especially in its republican form, calls for character as well as a highly developed political instinct in the mass of the people constituting the State; and when these conditions exist we may reasonably believe that, in a world which has come to cherish industrial rather than militant ideals, the popular republic may have a stability, a good order, and a capacity for progress which no other form of government has yet displayed. See CABINET; CONSTITUTION; CONSTITUTION OF THE UNITED STATES; DEMOCRACY; GOVERNMENT, and the authorities there referred to.

REPUBLICAN METHODIST CHURCH. See METHODISM; O'KELLY, JAMES.

REPUBLICAN PARTY. In the history of American politics the term Republican has been applied to political organizations representing the most diverse principles. During the years 1791-92, under the leadership of Jefferson, the opponents of centralization in the National Government were molded into an effective political party, which assumed the official name Democratic-Republican, though its members generally called themselves Republicans. Later this organization became known as the Democratic Party (q.v.). During the years 1825-29 the followers of Clay and of Adams were known as National Republicans. (See WHIG PARTY.) In ordinary usage, however, the term Republican is applied to the powerful party which was organized in 1854-56 and elected Lincoln in 1860.

The present Republican Party took its rise from one overpowering impulse—opposition to the extension of slavery. Northern Whigs acceded with great repugnance to the new Fugitive Slave Law of 1850 (see COMPROMISE OF 1850), and its enforcement became daily more odious. When the Kansas-Nebraska Bill (q.v.) became a law the revolt was instantaneous. On the very morning after the passing of this bill, May 27, 1854, a gathering of some thirty Congressmen discussed the necessity of organizing a new party, and it was agreed that 'Republican' would be its appropriate name. Previously, on February 28, 1854, a mass meeting of Whigs, Democrats, and Free Soilers, in Ripon, Wis., had resolved that if the Kansas-Nebraska Bill should pass, they would "throw old party organizations to the winds, and organize a new party on the sole issue of the non-extension of slavery." Three weeks later local organization was effected, and the name 'Republican' was suggested as the one which the party should and probably would adopt. It was in Michigan, however, that the fusion of the opponents of the extension of slavery first completed a State organization, and formally adopted the name (July 6, 1854).

The new party was formed not so much by a coalition as by a fusion of diverse elements. There were: (a) a large proportion of the anti-slavery Whigs, like Seward, Greeley, and Lincoln; (b) the Free Soilers (see FREE SOIL PARTY), like Hale, Julian, and Sumner; (c) a great body of Know-Nothings, like Wilson, Banks, and Colfax; (d) some Abolitionists, who, though impatient with the Republicans' repeated assertion that they did not purpose to interfere with slavery where it actually existed, nevertheless found in the new party the best promise of effective opposition to slavery; and finally (e) anti-slavery Democrats, such as Hamlin, Cameron, and Bryant, who brought with them a strong popularizing influence. Later the war crisis led other Democrats into the Republican ranks, though in some in-

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stances, as in the cases of Butler and Johnson, their allegiance was but temporary.

Before the new party had been in existence a year it had secured a popular majority for the opponents of slavery in 15 of the 31 States, and had elected 11 United States Senators and a plurality in the House of Representatives. The first Republican national convention met at Philadelphia, on June 17, 1856, and was attended by delegates from all the Northern States, from the Territories of Minnesota, Nebraska, and Kansas, from the District of Columbia, from Virginia, and from the border States of Delaware, Maryland, and Kentucky. The nomination for the Presidency was given to John C. Frémont, whose career as an explorer and pioneer made him a magnetic leader. The platform declared it to be "both the right and the duty of Congress to prohibit in the Territories those twin relics of barbarism, polygamy and slavery;" it demanded the immediate admission of Kansas as a free State, and denounced the Ostend Manifesto (q.v.), "with its highwayman's plea that might makes right." Whig influence was apparent in its strong declaration in favor of internal improvements at national expense, including the construction of a railway to the Pacific. Frémont obtained 114 electoral votes (Buchanan, the Democratic candidate, receiving 174), and polled a popular vote of 1,341,264, carrying all the free States with the exception of New Jersey, California, Pennsylvania, Indiana, and Illinois. (See ELECTORAL VOTES and UNITED STATES, section *History*, for details on Presidential elections.) A slight falling off in Republican strength in Congress reflected the waning of the first enthusiasm and the defection of some of the least disinterested members, but their places were soon more than filled by new adherents from the shattered American Party and from Whigs and Democrats, to whom the Dred Scott decision and the Lecompton Bill were intolerable. During Buchanan's administration the Republicans devoted their efforts to protesting against the extension of slavery, and to unsuccessful attempts to secure the passage of a Homestead Bill and the appropriation of public lands for educational purposes. In 1860 the Republican national convention was held in Chicago. The platform denounced Democratic threats of disunion; insisted that the rights of the States should be maintained inviolate, especially the right of each State to order and control its own domestic institutions according to its own judgment exclusively; declared that "the normal condition of all the territory of the United States is that of freedom, which Congress is bound to preserve and defend;" demanded the prompt admission of Kansas as a free State, and the passage of a Homestead Bill; favored a protective tariff, and river and harbor improvements; and advocated a Pacific railway, to be aided by national grants. In the balloting for candidates the more prominent leaders, Seward and Chase, were soon passed over as having made too many enemies or aroused too great apprehensions, and on the third ballot the nomination fell to Lincoln, largely from considerations of 'availability,' for as yet the full measure of his strength had by no means been revealed. Governor Hamlin, of Maine, a former Democrat, was given the second place on the ticket. Out of the 303 electoral votes Lincoln received 180, and his plurality was nearly 500,000; but his strength was exclusively in the North, and his vote fell far short of a majority.

Republican rule began even before Lincoln's inauguration, for in the closing months of the 30th Congress the withdrawal of Southern members gave the Republicans a majority in both Houses, a fact promptly signalized by the admission of Kansas, and by the passage of a protective tariff act. The conduct of the war against the Confederate States was thrown into the hands of the loose-constructionist Republican Party; yet the opposition, especially in the later years of the conflict, was vigorous. The chief war measures were enacted by Republican votes, and favorite Republican policies were also brought to realization in the Homestead Bill of 1862, and the grants in aid of railways and of education. Really 'pivotal,' however, was the party's policy toward slavery. Here Lincoln himself took the lead. The preliminary Proclamation of Emancipation (q.v.), issued upon his own responsibility, served to "unite the South and divide the North." Formidable reaction followed, and in the autumn elections of 1862 the very existence of the Union was at stake. No one could doubt that the loss of Republican ascendency would result in the ending of the war by some compromise which would involve the dissolution of the Union, yet the great States New York, Pennsylvania, Ohio, Indiana, and Illinois all showed Democratic majorities; but the New England States, Kansas and Minnesota, California and Oregon followed the President's leading, and the border States, too, came to the support of his policy. In the resulting Congress the Republicans found themselves in control by a majority of about twenty votes. Lincoln's policy had been vindicated: he had been clear-sighted enough to recognize that the moment had come to commit the party to an aggressive policy, and on a question of right and wrong he had been willing to trust the people. But nothing less than an amendment to the Constitution could be relied upon actually to abolish slavery forever. Such an amendment was proposed in December, 1863, but went over to the next session, and therefore became one of the vital issues of the campaign of 1864. Lincoln insisted that the advocacy of such an amendment should be made the 'keystone' of the platform. In sharp contrast with the resolutions of 1860, the Republican Convention now declared that slavery was the cause and the strength of the rebellion; that it was "hostile to the principle of republican government," and that "the national safety demanded its utter and complete extirpation from the soil of the Republic;" that the Constitution should be so amended as to "terminate and forever prohibit the existence of slavery within the limits or the jurisdiction of the United States;" and that no terms but unconditional surrender should be granted to the rebellious States. Lincoln was renominated by acclamation, and, as a mark of recognition of the patriotism of the loyal men of the border States, the nomination for the Vice-Presidency was given to Andrew Johnson, of Tennessee. Lincoln's vote in the electoral college exceeded that of his Democratic opponent, McClellan, ten to one, yet it is significant that his popular majority was less than 500,000. January 28, 1865, with the aid of eleven Democratic votes, the joint resolution (v. Amend. XIII. U. S. Const.) was passed by the House.

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The end of the war found the Republican Party strong and united. But a severer test awaited it in the problem of reconstruction (q.v.), and but few weeks were needed to show how irreparable a loss the party had sustained in the death of Lincoln, and what a wretched blunder, from a purely Republican point of view, it had committed in making it possible for a strict-constructionist Democrat of Johnson's personality and antecedents to become President. During Johnson's administration the Republican majority in both Houses of Congress was overwhelming. Between the President and Congress there speedily arose over the policy to be pursued in reconstructing the South a controversy which culminated in the unsuccessful impeachment. The party in its platform of 1868 sanctioned the reconstruction policy of Congress, and insisted upon "equal suffrage to all loyal men in the South." General Grant received the unanimous nomination for the Presidency. His election was made a certainty by the fact that in the South negro suffrage was protected by Federal arms, while many of the whites were still disfranchised. Consequently only four of the Southern States, Delaware, Maryland, Kentucky, and Louisiana, chose Democratic electors. Republican majorities were maintained in both branches of Congress throughout Grant's first administration, although the opposition was gradually gaining strength. As a party measure the ratification of the Fourteenth and Fifteenth Amendments was exacted from Mississippi, Texas, and Virginia as a condition precedent to readmission, and the appointment of Federal supervisors of elections was authorized. Stimulated by protests against the manipulation of office for private or party purposes, the Republicans passed the first law for the reform of the civil service. The growing sentiment in favor of universal amnesty, universal enfranchisement, civil service reform, and the limiting of the power of the Federal Government over the local affairs of the States led to the breaking away of the Liberal Republicans (q.v.), who in 1872 made these the chief planks in their platform. Their avowed failure to come to any agreement as to the tariff, and their ill-advised nomination of Greeley, made the movement but a slight menace to the reëlection of Grant, whom the Republicans had unanimously renominated upon a platform consisting chiefly of a glorification of the party's past achievements and strongly advocating a protective tariff. As a result of the Crédit Mobilier (q.v.) and other scandals the feeling became widespread that the Republican Party's long tenure of office had lowered the ethical tone of the party, and had given it into the hands of self-seeking and overbearing leaders. Moreover, the Republicans, as the party in power, were held responsible for the panic of 1873. Hence defection grew to such an extent that many of the Northern States were carried by the Democrats, who in 1875 secured a majority of 182 to 110 in the House. The Republican national convention in 1876 indorsed civil service reform, and commended the provision already made for the resumption of specie payments. The nomination for the Presidency was given to Governor Hayes of Ohio, and in the ensuing campaign many of the Liberal Republican bolters returned to their former allegiance. The result of the election was long in doubt, but by the Electoral Commission (q.v.) all the questions at issue were decided in favor of Hayes, who was declared to have received 185 votes to 184 for Tilden, his Democratic opponent.

With the administration of Hayes there began a new period in the history of the Republican Party. The issues which had called it into existence had passed away, and the withdrawal by the President of the Federal troops from the South at the beginning of his administration may be said to have closed the strife between the two sections of the country. The old party leaders had left the field, for the most part, and their places had been taken by such men as Blaine, Garfield, Conkling, Sherman, Schurz, Hoar, and Edmunds. The task which faced them was new, for economic problems upon which neither party had developed well-united views had become dominant; the currency, the tariff, and commercial relations were to be adjusted to the new and rapidly expanding industrial life of the people. In the first two years of Hayes's administration the Democrats were in control of the House, and in the last two years of both branches of Congress, while from the members of his own party the President received but half-hearted support, for it was by the aid of Republican votes that the Bland Silver-Purchase Bill was passed over his veto, and that the further retirement of United States notes was forbidden. The Republican convention of 1880 favored a protective tariff, Federal aid to popular education, "the protection of the honest voter at the South," and thorough civil service reform. Grant was for a time the leading candidate, but after a long contest the convention was 'stampeded' for Garfield, who was nominated on the thirty-sixth ballot. In order to conciliate the supporters of Grant, the second place on the ticket was given to Chester A. Arthur. During the administrations of Garfield and Arthur party lines were greatly blurred. The tariff act of 1883 and also the Pendleton Civil Service Bill received support from both sides of the chambers, yet they were in the main regarded as Republican measures. In 1884 the Republican platform was unusually pronounced in its advocacy of a protective tariff and urged international bi-metallism, the regulation of interstate commerce, and the restoration of the navy to its old-time strength and efficiency. The nomination of Blaine proved in many respects to be ill-advised. A large section of the party (see MUGWUMP) refused to support him, and gave their votes mainly for Cleveland, who was elected, carrying not only the 'Solid South,' but also New York, Connecticut, New Jersey, and Indiana. During his administration Democrats were in the majority in the House. Substantial gains were made in the reform of the civil service and in the regulation of interstate commerce (Act of 1887), both of which the Republican platform had urged. A protectionist faction in the Democratic Party aided the Republicans in preventing a reduction of import duties. Cleveland's message of December, 1887, made the tariff the dominant issue of the campaign of the following year. The Republican platform declared the party to be "uncompromisingly in favor of the American system of protection;" asserted its opposition to combinations organized "to control arbitrarily the conditions of trade among citizens;" favored the "use of both silver and gold as money," and the building up of a strong navy. The nomination of Harrison,

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of Indiana, and Morton, of New York, helped the party to regain those States and win the election. A scanty majority was secured in both branches of Congress. The "Omnibus Bill" for the admission of the Dakotas, Montana, and Washington brought the Republicans some votes, and Speaker Reed's rules put the House under the firm control of the majority, although they aroused not a little opposition. The protectionist McKinley Tariff Bill was passed, with the addition of a reciprocity clause. But in the Congressional elections of 1890 the Republicans were overwhelmingly defeated, and the Democrats carried the Presidential election of 1892 by a large electoral majority. The Republican platform had been very similar to that of 1888, and the nominations had aroused little enthusiasm; a rise in retail prices had followed the going into effect of the McKinley tariff, and had made it unpopular. During the first half of Cleveland's second administration the Republicans were in a decided minority in both Houses. But the reaction due to the disastrous panic of 1893 and dissatisfaction with the long-deferred and inconsistent Wilson-Gorman Tariff Bill presently reversed the situation in Congress, again bringing the Republicans into control. In the campaign of 1896 the currency issue was the all-important one. Twenty-two Republican State conventions pronounced against the free coinage of silver, and the platform of the national convention asserted the party's opposition to free coinage except by international agreement. Upon the adoption of this resolution, thirty-four free-silver delegates withdrew from the convention. The platform further "renewed and emphasized the party's allegiance to the policy of protection," and promised "to all of our products" "the most ample protection;" it favored a protectorate over Hawaii, and insisted that the United States "should actively use its influence and good offices to restore peace and give independence to Cuba." In this campaign the Republicans received aid from the 'Gold Democrats;' even the 'Solid South' was broken. McKinley received a majority over all other candidates of 286,257. The appeal which the Democrats had made to class animosity had reacted in favor of the Republicans, as the party of conservatism. In the following year the Republicans found themselves in control of both branches of Congress, though their majority in the Senate was but narrow. The Dingley Bill was promptly passed, restoring the strongly protective character to the tariff. The war with Spain, in 1898, forced to the front questions of policy which had been quite unforeseen, and on which clean-cut party lines could not be drawn. The annexation of Hawaii had long been a favorite measure with some Republicans, and was effected by Republican votes. In 1899 the Republicans secured a strong majority in the Senate, and forthwith enacted a law making the gold dollar unequivocally the unit of value. Upon questions relating to the government of 'dependencies,' however, there was some crossing of party lines, a few leading Republicans with most of the Democrats taking the ground that the United States could not govern alien peoples without the consent of the governed. In the campaign of 1900 the great issue was that of 'imperialistic expansion.' The Republican platform renewed the pledge of independence to Cuba; and declared it to be "the high duty of the Government" "to put down armed insurrection and to confer the blessings of liberty and civilization upon all rescued peoples," promising them the largest measure of self-government consistent with their welfare and our duties. Again McKinley was the Republican nominee against Bryan, and he increased his vote over that of 1896. Outside of the Southern States the Democrats secured only 13 electoral votes, all from States dominated by the silver interest. In the first Congress of the new century the Republicans increased their strength in both Houses. The pledge of Cuban independence was redeemed, but within the party there arose serious differences as to the policy to be pursued toward the Philippines and also over reciprocity, which had been strongly indorsed in Republican platforms, but to which large financial interests, of great weight in Republican councils, stood inflexibly opposed.

The Republican Party began its career through a fusion of various party elements opposed to the extension of slavery. Its original task was accomplished with the close of the reconstruction period. New tasks have caused a differentiation in the party's personnel and in its centres of influence. In the industrial agitations of the closing years of the nineteenth century it found itself forced to stand upon the defensive as the party of conservatism. It has ever represented strong nationalizing forces at home, and a vigorous foreign policy, and its principles of broad interpretation of the Constitution have led it to enter with confidence upon the solution of problems imposed upon the United States by the expansion which followed the war with Spain.

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REPUBLICAN RIVER. One of the head-streams of the Kansas River. It is formed by two forks in east central Colorado, and flows northeast into Nebraska, then east, and finally southeast into Kansas, where it joins the Smoky Hill River at Junction City to form the Kansas River (Map: Nebraska, F 3). It is about 500 miles long.

REPUDIATION (Lat. *repudiatio*, from *repudiare*, to repudiate, from *repudium*, repudiation, rejection of what one is ashamed of, from *re-*, back again, anew + *pudere*, to be ashamed). The refusal of a State or government to pay its debt. It grows out of the practical bankruptcy of the State, though it often seeks justification

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in the plea that the obligations previously admitted were illegal and therefore invalid. Debt-scaling by refunding operations frequently approaches repudiation in its practical effects, though it generally escapes the reproach of the name unless there are obligations or classes of obligations which are wholly ignored in the process. Among nations and States of weak public credit the practices mentioned are only too familiar, but the odium of the name attaches particularly to the history of the financiering of the American commonwealths. In 1790 all existing State debts had been assumed by the general Government, partly on the ground of justice, because they had been contracted in the prosecution of the Revolutionary War, partly on that of expediency, as a means of strengthening the public credit. For a period of 40 years thereafter the State governments remained almost free from liabilities, notwithstanding the fact that the War of 1812 had called for extraordinary expenditures, and in 1830 the aggregate debt of all the States was only $13,000,000. Then began an era of extravagant speculation and reckless enterprise. Population was increasing, and production was increasing even faster than population. The resources of the soil were more than equal to any demands that could be made upon them. But as yet no adequate means of communication between producer and consumer had been established, and a universal need was felt for such facilities of transportation as would insure quick delivery at moderate rates. To the sanguine colonist it seemed that the construction of railroads and canals was a work of public importance which would justify almost any financial assistance on the part of the State, and would return the investment a hundredfold.

States issued bonds in aid of the construction of railroads and canals, and in the South especially subscribed to bank stock, for the purchase of which they issued bonds. In other cases they simply indorsed the bonds of railroads and banks. Nor was it difficult for the States to secure loans. The United States national credit stood high abroad. Not only had the interest been promptly paid upon the national debt, but the United States offered the extraordinary spectacle of a nation which had actually paid the principal. European money-lenders, who had not yet learned to discriminate between national and State securities, felt confidence both in the honor and in the resources of the country. The bonds of the several States were therefore easily disposed of in foreign markets, until in 1842 their aggregate debt had swollen to the enormous total of $213,000,000, an increase of more than 1500 per cent. since 1830. The panic of 1837 and the subsequent tightening of the money market precipitated the inevitable crash. First, Indiana found it impossible to meet the interest of her debts in 1840; Ohio was saved from following her example only by extraordinary efforts. Two years later the Bank of Pennsylvania failed, and every bank south of Philadelphia suspended payment. In the panic that ensued, Pennsylvania, Maryland, Mississippi, Michigan, Florida, Indiana, and Illinois found themselves in a condition approaching bankruptcy. But though all these States suspended payment of accruing interest, all of them, except Mississippi, Michigan, and Florida, finally weathered the storm without resorting to the repudiation of any part of the capital debt.

It was in Mississippi that the word repudiation originated, in a message by Governor McNut of that State suggesting the plan of "repudiating the sale of certain of the State bonds on account of fraud and illegality." The bonds, to the amount of $5,000,000, had been issued in 1838 as a subscription to stock of the Union Bank of Mississippi. As the bank succumbed early to reckless management and the security of the State became worthless, the State found itself saddled with a debt from whose expenditure it had had no benefit. It is not surprising that certain apparent irregularities in the issue of the bonds should be seized upon as a pretext for denying the debt, though the courts of the State later decided that these irregularities were not so material as to invalidate the bonds. The Legislature of Mississippi promptly branded this suggestion of repudiation as "a calumny upon the justice, honor, and dignity of the State." But though for the time being the bonds were thus saved from being formally repudiated, they fell into default. Successive Governors, indeed, urged their payment, but no provision was made for the purpose until 1852, when a proposition to levy a tax to pay the bonds and interest was submitted to the people and defeated at the polls by an overwhelming majority. Florida, which in the thirties had borrowed about $3,900,000 for the support of banks, was caught in the bank failures and refused to pay her debts. In the meanwhile Michigan had repudiated a portion of its liabilities under the following circumstances: Certain bonds had been disposed of to the Morris Canal and Banking Company, to be paid for in installments. The Bank of Pennsylvania had become surety for the payment of these installments as they fell due. But canal company and bank both failed. It was ascertained that a large amount of the bonds, for which only partial payment had been made, had been transferred from the canal company to the bank, the latter having full knowledge, of course, of all the facts. It is true that the bonds had been hypothecated in foreign markets, and were now in the possession of innocent holders. Nevertheless, the State claimed that it was bound to repay only the money it had actually received, called for the surrender of the 'part paid' bonds, and issued new certificates for the amount it had actually received, with interest thereon.

The course pursued by Louisiana was equally open to criticism. The State had raised capital for internal improvements by loaning her credit to banks whose stock was secured by mortgages on real estate. During the era of prosperity these banks discounted a great deal of business paper which turned out to be bad when the day of trial came. In 1843 the Legislature enacted that all debts due to the bank should be payable in the depreciated State bonds issued by the banks, at their par value. In ante-bellum times, however, repudiation was in its infancy. After the war it sprang to great proportions, as the Southern States generally repudiated their debts. The burden of debts had greatly increased from 1860 to 1870, while the resources of the country had been wasted by the war. Practically no interest had been paid upon the debt contracted before the war. The so-called period of reconstruction was, moreover, riotous in its expendi-

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ture of public moneys and brought about a large increase of the debt. With the revival of old conditions and the return to power of the classes which nominally ruled the States, the inability to pay resulting from the impoverished condition of the country was combined with a reluctance to pay debts which in their opinion had been forced upon the States by outsiders. In this category they placed the accrued interest upon antebellum debts as well as much of the debt which had its birth in the so-called reconstruction era. It is impossible to follow the history in all its details. With pretexts of fraud, jobbing, and corruption in the issue of bonds, or on the simple plea of poverty, one Southern State after another annulled its obligations outright or so scaled them in refunding operations as to destroy a large part of their face value. The aggregate debts of the States along the coast from Virginia to Louisiana, with Arkansas and Tennessee, are computed to have reached, each State taken at its highest point, $236,000,000, while in 1880, after the policy of repudiation had been adopted, they amounted to $108,000,000. The Southern States were joined by one Northern State, Minnesota, which in 1880, after 22 years of agitation, denunciation, and negotiation, finally agreed to compromise the payment of certain railroad bonds (guaranteed by her as far back as 1858) at 50 cents on the dollar, and accrued interest, the plea being that the railroads had failed to comply with the conditions of the issue. The inevitable result of repudiation has been that foreign capitalists have learned to discriminate between the values of different State securities; and while the bonds of the non-repudiating States, including those Southern States which have not followed the example of their neighbors, command a premium, the bonds of the various repudiating States fluctuate at from 10 to 50 per cent. of their face value.

Repudiation has not been confined to States. During the five years immediately following the panic of 1873, numerous cities, towns, and counties, even within those States whose corporate credit remained unimpaired, finding it impossible to meet their obligations, sought to evade them by repudiation. By appeal to the United States courts, however, their creditors could command an impartial judicial determination of the question. This is impossible in the case of States, as the 11th amendment of the Constitution, adopted in 1794, expressly provides that though individuals may be sued by States, States cannot be sued by individuals. Under this amendment, and the decisions which have grown out of it, no power can legally coerce a State to keep its pledges. There is therefore no power in the United States Government to prevent a recurrence of the humiliating spectacle of repudiation. The States only can provide remedies for it. The substantial increase of wealth in all sections of the country affords a guarantee for the future. Another and perhaps more efficient safeguard against its recurrence is to be found in the innumerable restrictions upon the debt-making power of the States which have found their way into recent State Constitutions.

Consult Scott, *The Repudiation of State Debts* (New York, 1893).

REQUESTS, Court of. An ancient English court having minor chancery jurisdiction, and presided over by the Lord Privy Seal. It was inferior to the Court of Chancery. It was abolished by Stat. 16 and 17 Car. I., c. 10. Certain inferior courts for the collection of small claims were formerly called courts of requests, or courts of conscience. They have all been abolished by statute, or have become obsolete. See Court.

REQUIEM, rē'kwĭ-ĕm (Lat., rest). In the Roman Catholic Church, the mass for the dead; so called from the first word of the introit. Requiem masses were composed by many of the older masters, such as Palestrina, Vittoria, Anerio, Colonna. The most famous works of this kind in modern times are those of Mozart (1791); two of Cherubini, C minor (1793), D minor (1836); Berlioz (1837); Verdi (1873). One of the greatest choral works ever written bears also the title requiem, although it is written to German words selected from the Bible. This is the great *Ein deutsches Requiem* by Brahms, written on the death of his mother (1868).

REQUISITIONS (Lat. *requisitio*, from *requirere*, to search for, require, from *re-*, back again, anew + *quærere*, to seek). Articles of daily consumption and use levied by an invading army from the inhabitants of occupied territory. They must be distinguished from *contributions*, with which the term is often confused, the latter being properly confined to money impositions above the ordinary revenue which legitimately belongs to the invader; and from *fines*, which are payment exacted from a district by way of punishment for some offense committed against the enemy outside the regular military operations.

The adoption by civilized nations of modern rules of warfare prohibiting pillage does not guarantee security of property to an invaded district. The experiences of the past century have authorized three methods of obtaining support for an invading army from an occupied district. (1) It may purchase provisions and like articles required for consumption; (2) it may levy them at prices fixed by the commander; (3) it may force the inhabitants to furnish them without payment and on refusal send out detachments to collect them. Thus the produce of the farmer, the goods of the merchant, and the stock of the trader may be confiscated. By the Brussels Military Code (1874), Arts. 40, 42, rules are laid down governing the making of requisitions. It is customary for the modern army to have a vast commissary train, and requisitions are relied upon only to supplement this supply. The commander of the army may levy such articles as clothing and boots, to prepare which time is required, while corps commanders may requisition food and fodder for immediate use. The collections should be made through the local authorities, if these continue, by demand in writing, and receipt should be given as evidence of the compliance and as a voucher in case the Government should subsequently recoup the inhabitants. The discretion of the invader must be employed to apportion these demands to the resources of the district. *Contributions*, on the other hand, should be imposed only "on the order and repsonsibility of the general-in-chief, or of the supreme civil authority, established by the enemy in the occupied territory" (Brussels Code, S. 41). In levying contributions assessment should be made on the lines of civil taxation.

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Fines may be levied by the invading commander to secure the safety of his communications and his troops. Consult: "Instructions for the Government of the Armies of the United States in the Field," *General Order No. 100, Adjutant General's Office* (War Department, Washington, 1863); also "Brussels Military Code," in *Proceedings of Brussels Conference* (Brussels, 1874); and "Hague Military Code," in *Proceedings of the Hague Conference* (The Hague, 1898).

REREDOS (OF., behind the back). The wall at the back of an altar, seat, or large fireplace. In churches the reredos is usually in the form of a screen detached from the choir. It is of two forms: a slight movable screen, and a permanent heavier structure. The custom did not become common until the position of the priest at the altar changed, toward the twelfth century, so that his back was turned to the congregation. Early ones were often merely hanging tapestries on rods; some were screens of gold and silver reliefs rising at the back of the altar, like the Pala d'Oro at San Marco, Venice, and that at San Jacopo, Pistoia, while others were of carved ivory, like one in the Cluny Museum (Paris). The architectural screens, with niches, statues, marble reliefs, and paintings, are especially fine in English and Spanish churches. The reredos corresponds somewhat to the choir-screen previously used in the West and still used in the Greek and Russian churches between the altar and the congregation.

RERESBY, rēr'zbĭ, Sir JOHN (1634-89). An English historian, born in Thribergh, Yorkshire. He entered Trinity, Cambridge, but left almost immediately for Gray's Inn; traveled on the Continent for several years, and after the Restoration served as high sheriff of Yorkshire, then for several years in the House of Commons, and (1682 sqq.) as governor of York. He was an able politician and foresaw James's fall in time to save himself and make favor with William of Orange. His *Memoirs* (1734) and *Travels* printed with the *Memoirs* (1813, 1821, 1831) are very valuable documents for the history of the time.

RESACA DE LA PALMA, rā-sä'kä dā lä päl'mä, BATTLE OF. A short but hotly contested engagement, fought on May 9, 1846, during the Mexican War, between about 5000 Mexicans under General Arista and about 2300 Americans under General Taylor, which ended in the defeat of the Mexicans. The ravine in which it occurred, covered by a thick growth of palm trees, is in Cameron County, Texas, 4 miles north of Brownsville, on the Point Isabel road. The Americans lost 39 killed and 83 wounded, the Mexicans about 160 killed, 228 wounded, and 100 missing, though by some writers the total number of killed, wounded, and missing has been given as 1000. Consult: Bancroft, *History of Mexico*, vol. v. (San Francisco, 1885); and Howard, *Life of General Taylor* (New York, 1892), in the "Great Commanders Series." See MEXICAN WAR.

RÉSAL, rā'zäl', HENRY AMÉ (1828-96). A French mathematician and engineer, born in Plombières (Vosges), and educated at the Ecole Polytechnique and at the School of Mines. He served for fifteen years as departmental engineer of Doubs, gaining some repute there for his work on the mathematics of geology; became professor of mechanics in the Polytec 1870; was elected to the Academy of S 1873; and in 1888 was appointed general of mines. Résal wrote many memoirs on mechanics and physics. lished work includes: *Traité de cinémat* (1862); *Traité de mécanique céleste* (ed. 1884); *Traité de mécanique* (1873-89); *Traité des surfaces* (1891) French version of Salmon's *Analytica etry* (1870).

RESCISSION (Lat. *rescissio*, a cuttin trenchment, from *rescindere*, to cut off, f back again, anew + *scindere*, to cut). In rescinding or setting aside of a contract, by mutual agreement of the parties to it direction of a court of equity because o legal defect in the contract. See CONTRA

In the case of rescission not dependi mutual agreement, the right to rescind n based either upon fraud or mistake in t ception of the contract. The right of res on ground of fraud arises as soon as the who is entitled to rescind has notice of the If, with full knowledge of the fraud, he con to act under the contract or pursuant to its t he will be deemed to have approved the con and to have waived his right of rescission. rescission of the contract he is entitled to pel a restoration of property which he given as performance of the contract on part or to recover its money value in a q contract action. He cannot, however, recover property so given from third parties who purchasers for value without notice. See FRA EQUITY.

A court of equity, however, will disregard parol-evidence rule as to written contracts (EVIDENCE) if it finds that there was actua no agreement or meeting of the minds of parties as to the term of the contract, and will compel a surrender and cancellation of t written contract and a restoration of the parti to the contract to their original positions. Th form of relief is technically known as rescissio although its real purpose is to render no effective written evidence which has been in properly obtained or given. In case of all ve bal contracts one entitled to rescind may do s without the aid of a legal proceeding by merel giving notice. This right, although equitable i character, is recognized and enforced at law Upon giving such notice to the other party to the contract it is thereupon deemed to be at an end; and the party rescinding the contract is entitled to receive back the money or property which he has given under the contract, the title to the money or property being revested in him by operation of law as consequence of the rescission. He may not lawfully take the property forcibly, however (see REMEDY), but may at his election bring an action in quasi contract for the value of his performance under the contract, or trover for damages for refusal to return property, or replevin to recover the property itself. As a condition precedent to rescission he should also return any money or property which he has received under the contract.

In case of all contracts, whether written or verbal, if one entitled to rescind the contract on ground of fraud is sued upon the contract, he may set up the fraud as a defense. Fraud is strictly an equitable defense, but it has been

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completely adopted by the law. It does not conflict with the parol-evidence rule, as the effect of proof of fraud is not to vary the terms of the contract, but to show that on equitable grounds the contract actually entered into should not be permitted to remain operative. If, however, one who has entered into a written contract wishes to be released from its obligations at any time on ground of mistake, or if he wishes to be released from the contract at any time before he is actually sued upon it on the ground that the contract was induced by fraud, his only relief is in equity, since the primary relief which he seeks is the cancellation and surrender of the contract. See CHANCERY; EQUITY. See also REFORMATION.

RESCRIPTS (Lat. *rescriptum*, answer, from *rescribere*, to write back, from *re-*, back again, anew + *scribere*, to write). Answers of the emperors and popes to questions in jurisprudence officially propounded to them. In the Roman Empire the *rescripta principis* were one of the authoritative sources of the civil law. After the third century they increased in number rapidly and superseded the responses of the jurists as one of the most important sources of Roman law, the privilege of giving responses no longer being conferred upon the jurists. The rescripts directed to corporate and municipal bodies were known as *pragmaticæ sanctiones*, a name which has found its way into the public law of Europe. See PRAGMATIC SANCTION.

RESCUE. In criminal law, procuring or aiding in the forcible deliverance of a prisoner from lawful imprisonment, by a third person. By the common law, a rescuer was held guilty of the same degree of crime as the prisoner, if he knew that the latter was lawfully detained when he rescued him. This knowledge was presumed if the culprit was in prison, or in the custody of an officer of the law, at the time. To-day, the offence is punishable in most jurisdictions, but not with the same severity as at common law.

In maritime law a rescue is the retaking of a captured prize from the enemy by prisoners of war. The latter do not acquire any rights in the recaptured property, but must return it to the lawful owners.

RESCUE GRASS, SCHRADER'S BROME GRASS (*Bromus unioloides*). A strong-growing South American grass introduced into many parts of the world; in the United States under the name of Australian oat. Its leaves are flat, linear, slightly roughened; its panicles spreading with numerous rather large flattened spikelets resembling the well-known 'chess' or 'cheat,' to which it is closely related. It grows rapidly to a height of 1 to 3 feet, seeds freely, and dies after seeding. In the Southern States it is regarded as one of the best winter grasses, as it makes its principal growth during cool weather. It is usually cut several times during the season and if prevented from seeding continues for 2 or 3 years. If properly treated it is a valuable brome grass (q.v.), excelling rye or oats as a winter grass and in the large amount of nutritious hay it yields. It withstands drought well and will grow on almost any soil; its best growth, however, is on rich moist soil.

RESECTION (Lat. *resectio*, from *resecare*, to cut off, from *re-*, back again, anew + *secare*, to cut; connected with OHG. *sega*, Ger. *Säge*, AS. *sage*, *sayu*, Eng. *saw*), or EXCISION OF JOINTS. An operation in which the diseased bone of a joint is cut out, in place of cutting off the entire limb. This operation is safer in properly selected cases than is amputation, since there is diminished shock from the absence of severance of large nerve trunks, arteries, and veins. Besides this advantage there is left to the patient a fairly useful limb, though there is, of course, more or less shortening and the motility of the joint is lost. The extent of the disease process present and the possibility of extension of the disease above the joint after operation, as occurs in malignant disease (see TUMOR), are the factors that determine the surgeon in a choice between resection and amputation. In young patients, where excision of a joint often includes the epiphyses of the growing bones and interferes materially with the future growth and development of the limb, the scope of the operation is much restricted. Owing to the development of more conservative measures in dealing with diseases of the joints, formal or complete excisions are not now practiced as much as they were by surgeons of a decade ago. For a description of the operation of excision as applied to the different bones and joints, consult Stimson, *Operative Surgery* (Philadelphia, 1893).

RESERVATION (ML. *reservatio*, from Lat. *reservare*, to keep back, from *re-*, back again, anew + *servare*, to keep). In English law a term applied to a clause in a deed, lease, or grant of land, which reserves out of the estate conveyed a right or interest in a portion of it. An estate in a 'stranger,' or person not a party to the conveyance, cannot be created by reservation, which can only operate in favor of the grantor himself. In the United States the word is frequently used as synonymous with exception. (See CONVEYANCE; DEED; MORTGAGE; LEASE.) The term is also employed to describe a method of obtaining the opinion of a full bench of a court or an appellate court upon a point of law as to which the trial judge is doubtful. This often saves the necessity of making a ruling compelling the parties to appeal afterwards. The jury is usually allowed to find the facts, and the verdict or judgment is not entered until the reserved point is decided. In many code States this is accomplished by taking a verdict subject to the opinion of the court.

RESERVATIONS, INDIAN. See INDIAN AFFAIRS; TREATIES, INDIAN.

RESERVE (OF. *reserve*, Fr. *réserve*, from OF. *reserver*, Fr. *réserver*, to reserve, from Lat. *reservare*, to keep back). A term common in military affairs both as regards the material and the personnel of an army. For *reserve* in European armies, see ARMIES; LANDWEHR; MILITIA; VOLUNTEER, MILITARY.

RESERVE, NAVAL. See NAVAL RESERVE.

RESERVED CASES. A term applied in the Roman Catholic Church to sins of a heinous character, such as heresy, simony, and sacrilege, that for their adequate treatment require the attention of an ecclesiastic superior to the parish priest, either the Pope, the bishop, or the head of an Order. The object of transferring the right to absolve such sins to the higher ecclesiastic is partly to impress upon the offender the true turpitude of his offense. Consult Hausmann,

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Geschichte der päpstlichen Reservatfälle (Regensburg, 1868).

RESERVOIR. See DAMS AND RESERVOIRS; WATER-WORKS.

RESHID PASHA, re-shēd′ pä-shä′, MUSTAPHA MEHEMET (1802-58). A Turkish statesman, and long the chief of the Party of Progress in Turkey. He was born at Constantinople. In 1833 he negotiated the Treaty of Kutaia with Mehemet Ali (q.v.), the rebellious Viceroy of Egypt. He subsequently represented Turkey at the courts of Great Britain and France, but was recalled in 1837, and made Foreign Minister. In this office he aided the Sultan Mahmud II. in carrying out his plans for the reform of the administration; but the Old Turkish Party forced him out of his office before the close of 1838. After this he was sent as envoy to London, Berlin, and Paris. On the death of Mahmud II., in 1839, when the Ottoman throne was tottering under a fresh onslaught by Mehemet Ali, Reshid Pasha was again called to take charge of the Foreign Office by the mother of the young Sultan, Abd-ul Medjid. He succeeded, after a debate in council of three days' duration, in obtaining the *hatti sherif* (q.v.) of Gulhane (November 3, 1839), a constitutional charter which, however, soon became a dead letter. His foreign diplomacy checked Mehemet Ali in Syria through the intervention of the Quadruple Alliance (Great Britain, Austria, Prussia, and Russia), but a seraglio intrigue led to his dismissal. From 1841 to 1845 he was the Turkish representative at the French Court. In 1845 he was once more made Foreign Minister, and in 1846 he was appointed Grand Vizier. He was repeatedly deposed, and almost immediately recalled, according as the anti-reform party gained or lost the favor of the Sultan; but the complications with Russia which arose in 1853 threw the anti-reformers into discredit, and Reshid Pasha, more powerful than ever, was again recalled to the direction of foreign affairs. In 1855 he again retired from office, which he did not resume till after the Peace of Paris.

RESHT, rĕsht. The capital of the Province of Ghilan, Persia, situated near the southwest shore of the Caspian Sea, 150 miles northwest of Teheran (Map: Persia, C. 3). The houses are tiled and neatly built, and the streets are paved. Water is supplied by an aqueduct. There are a vast ruined palace, numerous caravansaries, large bazaars, and about 1200 shops and warehouses. Indian wares are imported from Balfrush in Mazanderan, and European manufactures from Russian Armenia. Resht is the chief entrepôt for the Persian silk trade. Extensive manufactures of shawls and carpets are carried on. Population, about 40,000. Enzeli, the port of Resht, on the Caspian Sea, about 18 miles distant, has 1500 inhabitants.

RESICZABÁNYA, rĕ′shĭts-ō-bän′yō. A mining town in the County of Krassó-Szörény, Hungary, about 50 miles southeast of Temesvár. There are extensive iron and coal mines and iron works in the vicinity. Population, in 1900, 11,770.

RESIDENCE (ML. *residentia,* from Lat. *residere,* to reside, remain, from *re-,* back + *sedere,* to sit; connected with Gk. ἕζεσθαι, *hezesthai,* OChurch Slav. *sĕsti,* Skt. *sad,* Goth. *sitan,* OHG. *sizzen,* Ger. *sitzen,* AS. *sittan,* Eng. *sit*). The obligation to perform in person the duties of a benefice whose revenue was enjoyed. It was early a complaint that this obligation was violated. The Council of Sardica (347) in its twelfth canon enjoined upon bishops and in the sixteenth upon presbyters the duty of continuous service in their proper residence. The evil continued through the centuries. In Reformation times it was a reproach that non-resident holders of benefices were so common, owing to the custom of pluralities. The Council of Trent endeavored to remedy the evil by providing in its 23d and 24th sessions, that no prelate should absent himself from his diocese more than three months, except for urgent cause. In present practice in the Roman Catholic Church parish priests cannot be absent longer than one week from their cure, except with the permission of the bishop.

RESIDUAL ROCKS (from Lat. *residuum,* remainder, from *residere,* to reside, remain). Rocks which have been produced through the decomposition and disintegration of rocks belonging to any of the larger divisions; viz. sedimentary, igneous, and metamorphic rocks. The agents which bring about these changes are in part chemical and in part physical. The active agents of chemical change at the surface of the earth are oxygen, water, and carbonic acid, all of which exist in the atmosphere and in the waters which percolate within and near the earth's surface, and the changes which they bring about are chiefly oxidation, hydration, and carbonization. The new minerals which are developed by these processes may be said to be in general lighter in weight (more bulky) and more soluble than the minerals out of which they have been formed. They are also as a class softer, and possess for the most part a fibrous or scaly texture. Particularly due to the change in volume which this recrystallization involves, a physical force is brought into play which opens fractures in the rock and permits of its solution and disintegration. The more soluble constituents of the rock are taken in solution and removed, while the less soluble materials remain as a more or less incoherent mass constituting the residual rock type. The residue from rocks of igneous and generally granitic types has been given various names such as 'waste,' 'geest,' 'Gruss,' etc. In unglaciated regions residual rocks of this type occasionally possess their original textures, lacking only the compactness characteristic of those types. Where situated on steep slopes the upper portions of the deposit of waste will by the force of gravitation slide down toward the valley, a process which is described as 'creep.' In glaciated regions, on the contrary, the surface layers of waste have been carried away by the ice mantle and the hard underlying rock has usually also been planed down. The comparative recency of the glacial epochs in a geological sense thus furnishes a certain measure of the time necessary to decompose and disintegrate compact rock masses. The final product of decomposition and disintegration of granitic rocks is a fine clay or kaolin, and this has been the source of the great deposits of porcelain clay throughout the world. Before this final stage of the alteration has been reached the residual rock has usually the structural peculiarities of a coarser or finer sand, and thus we have the residual sand of granite, etc. Calca-

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reous rocks, such as limestone or dolomite, furnish in the initial stages of their solution and disintegration a granular calcareous sand. Joints and other fissure planes in massive rocks greatly facilitate the processes of decomposition and disintegration. The solutions which are active in these processes find their way along the joint planes as trunk lines, and by their more ready access to the edges and corners of included blocks of rock soon produce a spheroidal and often concentric structure. Thus are brought about spheroidal blocks of the igneous rock type, the centres of which are usually little changed, but the peripheral zones of which represent altered phases of the rock, the outermost being the most nearly disintegrated. This process goes on quite rapidly, as is shown by the fact that monuments and fence posts of basic igneous rocks have within the course of a century so far disintegrated as to be almost useless for the purposes to which they were applied.

Plant life by sending its roots into the soil protects from disintegration the underlying rocks. In arid regions, however, where little if any plant life can exist, winds are effective in removing the superficial layers of waste and continually exposing the underlying rock. The material removed by the winds on being deposited produces æolian rocks. See ÆOLIAN ACCUMULATIONS.

RESIDUARY LEGACY. A legacy of all that remains of an estate after the debts and specific legacies have been paid. Where a testator desires to give the bulk of his estate to one person, as his wife, and at the same time to make other smaller bequests, it is customary to make the latter by means of express or specific legacies, naming the amount or specific property, and then to devise and bequeath all the 'rest, residue, and remainder' of his estate to the favored person by a residuary clause. It sometimes happens, however, after the debts and minor specific legacies are paid, that the estate is exhausted, and the one whom the testator most intended to favor gets nothing. The best method of guarding against this contingency is to put a condition in each of the specific legacies to the effect that it shall be null and void if the appraised value of the estate is not in excess of a certain sum, or to make an express or specific bequest to the person who is to take precedence over the others, then make the other minor bequests, and conclude by making the first person the residuary legatee of the rest of the estate. See LEGACY; WILL.

RESINA, rā-sē'nā. A town in the Province of Naples, Italy, situated on the Gulf of Naples, at the foot of Vesuvius, 5 miles by rail southeast of Naples (Map: Italy, E 11). It is built on the site of ancient Herculaneum. Exquisite fruits are grown, and the famous *Lacrimæ Christi* wine is made in the vicinity. There are manufactures of silk, glass, and leather. The town is surrounded by country houses, and is a place of recreation for the Neapolitans. The ascent of Mount Vesuvius is begun at Resina. Population (commune), in 1901, 19,766.

RESINS (OF. *resine*, Fr. *résine*, from Lat. *resina*, resine, from Gk. *ῥητίνη*, *rhētinē*, pine-resin). A class of solid or semi-solid organic substances mostly of vegetable origin. The class includes many minerals which are assumed to be the product of extinct vegetation. The resins are allied to the volatile oils, in which they are found dissolved when directly obtained from plants. The various resins, all composed of carbon, hydrogen, and oxygen, differ widely in their chemical behavior.

The following are the general characters of this class of compounds: At ordinary temperatures they are solid, translucent, and for the most part colored, although some are colorless and transparent. Some are devoid of odor, while others give off an aromatic fragrance from the admixture of volatile oil. In their crude state they never crystallize, but are amorphous and brittle, breaking with a conchoidal fracture; when pure several of them may, however, be obtained in the crystalline form. They are readily melted by the action of heat, and are inflammable, burning with a white smoky flame. They are insoluble in water, but dissolve in alcohol, ether, and various oils. They are insulators or non-conductors of electricity, and become negatively electric by friction. Many of them possess acid properties, in which case their alcoholic solutions redden litmus. These resins combine with the alkalies, and form frothy soap-like solutions in alkaline lyes. The resinous soaps thus formed differ from ordinary soap in not being precipitated by chloride of sodium.

The resins are generally obtained by making incisions into the wood of trees which produce them; sometimes, however, they exude spontaneously, and in other cases require to be extracted from the wood with hot alcohol or other solvents. The crude resins are separated from the volatile oils, with which they form the so-called *oleo-resins*, by distillation; and from the gummy and mucilaginous matters with the aid of alcohol, which dissolves out the pure resins.

The resins are extensively used in making lacs and varnishes. Colophony, copaiba, jalap, podophyllum, and the resin of scammony are used medicinally. Colophony, or rosin, is an antiseptic and forms an excellent application for wounds and ulcers. Copaiba acts as a stimulant and disinfectant, and is often prescribed in gonorrhœa. Podophyllum, jalap, and the resin of scammony are purgatives, the latter causing profuse watery evacuation of the bowels.

Various *fossil resins* are known, of which the most important is amber. Some chemists place asphalt among this class; and among the fossil resins described by mineralogists may be mentioned copalin, hartite, xyloretin, etc.

Resins also form important constituents of the substances known as *gum resins* (see GUMS) and are contained in the so-called *balsams*, a class of liquid or semi-solid products including benzoin, styrax, and the balsams of Peru and Tolu. Resins containing benzoic or cinnamic acid are sometimes spoken of as 'solid balsams.' The common resin or rosin of commerce exudes in a semi-fluid state from several species of pine, being derived chiefly from the Pinus australis and the Pinus pinaster. The crude turpentine (an oleo-resin) obtained from these trees is distilled, leaving behind the resin, a brittle solid somewhat heavier than water. The resin soap used in the manufacture of common qualities of soap is obtained by boiling rosin for some time with caustic soda and water. Other resins most commonly known and used include copal, dam-

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mar, dragon's blood, frankincense, lac, mastic, and sandarac.

Consult: Wiesner, *Die technisch verwendeten Gummiarten, Harze und Balsame* (Erlangen 1869); Thenüis, *Die Harze und ihre Producte* (Vienna 1879); Cameron, *Oils, Resins, and Varnishes* (London, 1886).

RESIN WEED. See COMPASS PLANT.

RESISTANCE, ELECTRICAL. That property of a conductor which determines the intensity of an electric current flowing through it for a given difference of potential at its terminals. The resistance of a conductor varies with its temperature, but is the same for all currents. The unit of resistance, the ohm (q.v.) is such a resistance as will cause a current of one ampere to flow over a conductor when there is difference of potential of one volt between its terminals. This relation is given by Ohm's law that $C = \frac{E}{R}$, where C stands for the current, E for the electromotive force, and R for the resistance. The resistance of a homogeneous conductor will vary directly as its length and inversely as the area of its cross-section, or in the case of a round wire inversely as the square of the diameter. Specific resistance is the resistance of a centimeter cube of a substance in microhms, while the relative conductivity of a conductor is its relative resistance to some standard substance, generally annealed copper. Resistance may be measured by means of the Wheatstone bridge (q.v) or by substituting known resistances for unknown, so as to produce an equivalent current, which is indicated by the deflection of the galvanometer (q.v.). Another method is to use the differential galvanometer and so arrange the known resistances that the same current flows through each set of coils, while there are also methods where use is made of the condenser and ballistic galvanometer. See ELECTRICITY; CONDUCTOR; OHM; ELECTRICAL UNITS.

RES JUDICATA (Lat., thing adjudged). In law, a matter of controversy which has been finally decided and determined on its merits by a court of competent jurisdiction. This implies that there has been no fraud or collusion by which the court has been misled. The importance of this doctrine lies in the fact that if a matter is once judicially determined it cannot again be litigated. To make the entire subject-matter of an action *res judicata* all the parties interested must be made parties thereto, either as plaintiffs or defendants. Only the points actually decided come within this rule. See JEOPARDY; JUDGMENT.

RESOLUTION. In law, an act or official expression of the will of a legislative body, corporation, or organized assembly. The term is sometimes used as being synonymous with *ordinance*, when applied to an act of a municipal council or a board of aldermen. However, resolutions are usually adopted to authorize ministerial acts, or to express the sentiment or regard of a body, whereas ordinances are passed to prescribe permanent rules of conduct or law. For example: If a common council desires to regulate the speed of vehicles, it would be done by an ordinance; whereas, if the freedom of the city were to be extended to a distinguished guest, it would be done by a resolution.

In the civil law the discharge of a valid contract by consent of the parties or by decree of a court is said to be a *resolution* of the contract. This is distinguished from a rescission, which implies that the contract was void *ab initio*.

RESONANCE (OF. *resonnance*, Fr. *résonnance*, from Lat. *resonantia*, echo, from *resonare*, to sound back, from *re-*, back again, anew + *sonare*, to sound, from *sonus*, sound; connected with Skt. *svan*, to sound). A general mechanical property which has many illustrations in nature. If a large bell is to be set in motion, it is only necessary to apply a series of impulses regularly timed at intervals to correspond with the natural period of the body. The column of air in a bottle or tube may be set in vibration by waves whose period is the same as that of the column of air. (This is illustrated by the strengthening of certain sounds heard when a bottle or a large seashell is put near the ear, for in any room there are present waves of all periods.) If a train of ether-waves passes through some material medium the minute portions of which have a frequency the same as that of the waves, it will set these portions of matter vibrating. The waves thus lose energy, which is gained by the matter. See RADIATION; ABSORPTION OF WAVES.

RESONATOR. A device used in acoustics (q.v.) to reinforce or strengthen a given tone. Resonators, which are used largely in the analysis of sound, consist of hollow vessels usually bulb-shaped or cylindrical. The air of such a vessel has a natural period of vibration, and when the resonator is brought near a sounding body which is emitting waves of the same frequency the former will take up the vibration and will emit the sound. In analyzing sound which is made up of numerous harmonies or overtones the resonator will select a particular sound, which it will reinforce, and if a diaphragm is placed so that it will vibrate under the action of the air in the resonator, the motion can be communicated to a small gas flame, as in Koenig's manometric capsule. Resonators in the form of wooden boxes are frequently used to mount tuning forks on and are constructed of such dimensions that the contained air will vibrate in unison with the fork and so strengthen the sound.

RESORCIN, or **RESORCINOL** (from *res-in* + *orcin*), $C_6H_4(OH)_2$. A diatomic phenol first obtained by Hlasiwetz and Barth in 1864, by fusing resins with potassium hydroxide. It has since been obtained by various other reactions. On an industrial scale it is made by fusing the sodium salt of meta-benzene-disulphonic acid with caustic soda, resorcin being thus produced according to the following chemical equation:

$$\underset{\text{Sodium } m\text{-benzene-disulphonate}}{C_6H_4(SO_3Na)_2} + \underset{\text{Caustic soda}}{2NaOH} = \underset{\text{Resorcin}}{C_6H_4(OH)_2} + \underset{\text{Sodium sulphite}}{2Na_2SO_3}$$

The mixture is acidified with hydrochloric acid, and the resorcin is separated by means of ether or some other liquid in which it is soluble. The crude resorcin thus obtained is purified by distillation. It may be added that the meta-benzene-disulphonic acid used in making resorcin is obtained by heating benzene with fuming sulphuric acid. Pure resorcin is a colorless crystalline substance melting at 119° C. (246.2° F.) and boiling at 276.5° C. (529.7° F.). It has a faint odor and a sweetish taste, but leaves a dis-

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agreeable pungent after-taste. It is freely soluble in water, alcohol, ether, benzene, amyl alcohol, glycerin, and other organic liquids. Resorcin is largely used in the arts for the preparation of phthalein dyes, such as fluorescein, eosin, etc.; it is also employed in the manufacture of azo-colors. It is often used in medicine. When applied externally it has the effect of removing scales in chronic skin diseases; it is an excellent remedy for dandruff, a mixture of resorcin and glycerin being best employed for this purpose. Administered internally, in dilute form, it is very valuable in fermentative dyspepsia.

RESPIRATION (Lat. *respiratio*, from *respirare*, to breathe), ORGANS AND PROCESS OF. The two great objects of respiration are: (1) To supply that amount of oxygen to the body which is essential to its economy, and (2) to remove the carbon dioxide which has been produced as a waste product. We may consider the anatomical details of the respiratory process in man and mammals under three different heads. First, there must be a special respiratory organ —the lungs—affording by its internal arrangement an immense extent of internal surface, covered by vascular network, through which the blood flows in innumerable minute streamlets, only separated by an extremely thin membrane from the atmospheric air that has been inhaled; secondly, there must be such an arrangement of the circulating system that fresh blood may be continually driven through the lungs, and then onward to the general system; and thirdly, there must be arrangements for the frequent and regular change of air contained in the lungs. The special organs of respiration consist of the larynx, the trachea, the bronchi, and the lungs. For a description of the first two, see LARYNX; TRACHEA.

The two *bronchi* resemble the trachea in structure except that the incomplete rings are distributed on all sides of the tubes. The bronchi on entering the lungs divide into smaller and smaller branches until finally each minute branch terminates in a *pulmonary lobule*. The *smaller bronchi*, as they are called, lose their cartilaginous rings and the circular or transverse muscular layer forms a distinct coat. The mucous membrane is very delicate and lined with ciliated epithelium. Within the lobules of the lung the smaller bronchi divide still further into more minute branches and their structure becomes more delicate, until at last they consist only of a thin membrane lined by a single layer of squamous epithelium. At this point they widen out into small funnel-like air spaces (*intercellulur passages*), the walls of which bulge irregularly in different places into small sac-like dilatations which are the *air cells* of the lungs. These air cells are from $\frac{1}{150}$th to $\frac{1}{300}$th of an inch in diameter. Their walls are very thin and are lined by a single layer of flattened cells continuous with those of the intercellular passage. The air vesicles of one lobule do not communicate with those of another, nor even with those of adjacent intercellular passages as a rule. Therefore any obstruction of a bronchus cuts off the supply of air to the lobule beyond. Elastic tissue fills in the space between the air cells and within this elastic tissue ramifies a dense network of capillary blood vessels which lies close against the air cells and which is separated from their contents by only an extremely delicate membrane. It is here that the interchange of gaseous elements between the atmosphere and the blood takes place.

The pulmonary lobules are bound together by connective and elastic tissue to form very much larger structures called lobes. Of these lobes the right lung presents three and the left two. Each lung is enveloped by a serous covering—*the pleura*—which is reflected from the lung at the point where the bronchus and great blood vessels enter and passing outward line the cavity of the chest. (See PLEURA.) In health there is no space between the layer of the pleura which covers the lung and that which lines the chest wall, but in disease or injury serum, blood, pus, or air may collect therein. These conditions are termed respectively *pleurisy with effusion*, *hæmato-thorax*, *pyo-thorax* or *empyema*, and *pneumo-thorax*.

In consequence of the great number of air cells which constitute their substance (over 600,000,000, it has been calculated), the lungs (except in the fœtal state, when no air enters them) are the lightest organs, in relation to their size, in the body. Although their bulk is so great that, with the heart, they occupy almost the whole of the cavity of the chest, they only weigh about three pounds and a half in men, and two pounds and three-quarters in women. Their color varies at different ages. At birth they are of a pinkish white tint; in adult life they are of a slate color, and present a mottled appearance; and in old age they become of a still darker tint. The polygonal markings which are seen on the surface correspond to the outer surface of the lobules already noticed. Their shape is adapted to that of the cavity in which they are lodged, each lung being conical in form, with its apex rising into the neck, while its base, which is broad and concave, rests upon the convex surface of the diaphragm; and between the two lungs lie the heart and the great vessels that proceed from it. During life —except in certain diseases, as, for instance, pericarditis (q.v.)—the inner margins of the lungs nearly overlap the heart, leaving only a roundish space of that organ, less than two inches in diameter, uncovered, while their lower borders extend to the cartilages of the ribs, and fit into the angle formed between those cartilages and the diaphragm.

For the method by which the blood is perpetually changed in the lungs, see CIRCULATION.

For a description of the shape and framework of the chest, see CHEST. The chest (or thorax, as it is termed by anatomists) is so constructed as to be capable of enlargement in height (vertically), in depth (or from the front backward), and in width (or from side to side). Its height is increased mainly by the descent of the diaphragm, and to a certain extent by the elevation of the ribs and the widening of the intercostal spaces; while its depth and width are increased by the elevation of the ribs, which carry forward and elevate the breast-bone (or sternum), especially at its lowest end, and are slightly rotated on an imaginary axis, joining their extremities, by which their central portion is raised, and slightly removed from the mesial plane of the chest. It is only in forced or deep inspiration that all these means of enlarging the chest are called into play. An ordinary inspiration is attended in men with very slight elevation of the ribs (about one-twentieth of an inch), while in women the elevation is much greater, especially in the upper ribs, the

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cause of this difference in the sexes probably lying in the narrower waist of the female requiring a compensation in the upper part of the chest. There are three varieties of ordinary respiration —viz.: (1) Abdominal, or that chiefly effected by the diaphragm, and seen in the motion of the walls of the belly; (2) costo-inferior, or that in which the seven lower ribs are observed to act; and (3) costo-superior, or that effected in a considerable degree by the upper ribs. The first variety occurs in infants up to the end of the third year; the second in boys after the age of three, and in men; and the third in adult females.

The following points in connection with the respiratory movements require notice. Every complete act of respiration is divisible into four parts —viz.: (1) Inspiration; (2) a short pause, not always observed; (3) expiration; and (4) a considerable pause, occupying, according to Vierordt, about one-fifth of the whole time required for one complete respiratory act. The act of expiration is always more prolonged than that of inspiration, the former being to the latter in the ratio of 12: 10 in adult males, and as 14: 10 in children, women, and aged persons. The number of respiratory acts performed in a minute varies at different ages. According to Quetelet, at birth there are 44 respirations in one minute; at 5 years of age, 26; from 15 to 20, 20; from 20 to 25, 18.7; from 25 to 30, 16; from 30 to 50, 18.1; so that from 16 to 20 may be taken as the ordinary range for healthy adults, although Hutchinson gives the wide range of from 16 to 40. The average ratio which the number of respirations bear to the number of pulsations in a given time is about 1: 4½, and if there is any great deviation from this ratio, there is probably some obstruction to the aëration of the blood, or some disorder of the nervous system. Thus, in pneumonia (or inflammation of the lungs), in which a greater or less amount of pulmonary tissue is unfitted for its office, the number of the respirations increases in a more rapid proportion than the number of pulsations, so that the ratio becomes as 1: 3, or even as 1:2. In hysteria a similar or even greater deviation from the normal ratio may occur; and Elliotson records a case in which the respiratory movements were 98, or even 106, while the pulse was 104. On the other hand, in certain typhoid conditions, and in narcotic poisoning, the respiratory acts are diminished in number, the ratio of respiration to pulsations being as 1: 6, or even 1: 8.

When the lungs have been emptied as much as possible of air by the most powerful expiratory effort, they still contain a quantity over which we have no control, and which may be estimated at about 100 cubic inches. To this portion of the contents of the lungs the term *residual air* is applied. In addition to this residual air, physiologists distinguish, in connection with the respiratory process, *reserve air*, which is that portion which remains in the chest after an ordinary gentle expiration, but which may be displaced at will; *breathing* or *tidal air*, which is the volume that is displaced by the constant gentle inspiration and expiration; and *complemental air*, or the quantity which can be inhaled by the deepest possible inspiration, over and above that which is introduced in ordinary breathing. The greatest volume of air that can be expelled by the most powerful expiration, which is obviously the sum of the reserve, breathing, and complemental air, is designated as the *vital capacity*—a inally introduced by Dr. Hutchinso ventor of the spirometer, who found, fr 5000 observations, that of all the el factors which might be supposed to in *height* alone stood in a definite and con tion to it, this relation being express rule that "for every inch of stature fr feet, 8 additional cubic inches of air (a are given out by a forced expiration af inspiration." Hutchinson found that inches is the average capacity of a adult 5 feet and 7 inches tall. With bodily weight as a factor, Hutchinson fo "when the man exceeds the average we each height) by 7 per cent., the vital decreases 1 cubic inch per pound for 35 pounds above his weight." Age and development do not influence the result as might have been expected. It has b unfrequently observed that the vital cap small in athletic men, and that it has excess in persons by no means remarka physical power. The *maximum* vital c met with by Hutchinson was 464 cubic this was in a man 7 feet high, whose weig 308 pounds; the *minimum* was 46 cubic and occurred in the case of a dwarf whose was only 29 inches and who weighed 40 p The average inspiration in a healthy man is about 30 cubic inches, and this increase exercise of any kind. When we consider th amount of air taken in at each respirati only about one-seventh the capacity of the we see how slowly the air is renewed; bu law of the *diffusion of gases* (q.v.) here com play, for the air in the air cells and finer being charged by the respiratory process a great excess of carbonic acid, as compared the inspired air contained in the larger tub diffusion of the carbonic acid necessarily t place in the outward direction, while the ox from the air, or the air itself, similarly diff itself in an opposite direction, toward and the air cells themselves. The *total amoun* air which passes through the lungs in 24 hc must obviously vary with the extent and quency of the respiratory movements. The to daily amount for a person at rest is 686, cubic inches. This quantity is largely increa by exertion.

The *alterations* in the inspired air effected respiration consist essentially in the removal a portion of the oxygen, and its replacement a nearly corresponding bulk of carbonic aci The amount of carbonic acid in the expired a varies inversely with the number of respiration it reaches 5.5 per cent. (or more) when the re pirations are only 6 in the minute, while it fall as low as about 2.6 per cent. when the respira tions are 96 in the minute. About 4.35 per cent of carbonic acid is, on an average, added to th air in ordinary respiration, while about 4.782 pe cent. of oxygen is removed, the actual diminutio of bulk of the expired air (after the removal of the moisture obtained from the lungs) being about one forty-fifth of its volume. Hence, unless where there is free ventilation, the air in an apartment containing men or animals must soon become vitiated by containing a great excess of carbonic acid (for ordinary atmospheric air only contains about one part of carbonic acid in 2500 parts).

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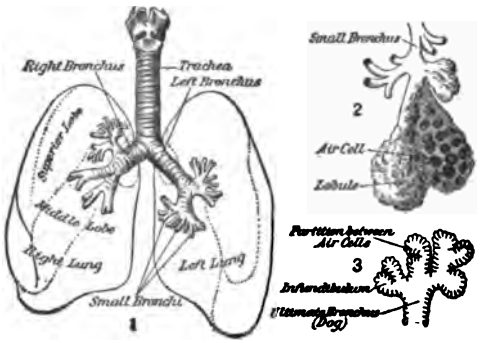
and a deficiency of oxygen. The absolute quantity of carbonic acid (and consequently of carbon) exhaled in 24 hours is liable to great variations, caused by the temperature and moisture of the air, age, sex, muscular development, the nature and quantity of the food, muscular exercise, sleep, state of health, etc. Smith calculated that an adult man in a state of rest exhales in 24 hours an amount of carbonic acid equivalent to 7.144 ounces of carbon, and he estimated that it should be increased to 8.68 and 11.7 ounces for non-laboring and laboring persons respectively at their ordinary rate of exertion; that the total amount of carbonic acid is greatly increased by external cold, and diminished by heat; that it is increased by a moist, and diminished by a dry atmosphere; that it increases in both sexes to about the thirtieth year, when it remains stationary for fifteen years, after which it diminishes; that at all ages beyond eight years it is greater in males than in females, and that it increases during pregnancy; that it is greater in robust than in slender men, the quantity of carbon expired per diem to each one pound of bodily weight being (according to Smith) 17.07, 17.51, and 17.99 grains at forty-eight, thirty-nine, and thirty-three years of age respectively; that it is greatly increased by eating, and is diminished by fasting; that it is increased by muscular exertion (Smith found that when walking three miles an hour he excreted 2.6 more carbonic acid than when at rest, while tread-wheel labor occasioned about double the excretion that was caused by walking); that it was diminished by sleep; and that it is increased in the exanthematous fevers (measles, smallpox, scarlatina, etc.) and in chlorosis, while it is diminished in typhus and in chronic diseases of the respiratory organs. See MUSCULAR FORCE.

There has been much discussion with regard to the extent to which the nitrogen of the air is affected by respiration. Usually a small amount of this gas is given off, but the quantities absorbed and exhaled so nearly balance each other that its special action on the organism must be very trifling, further than as being a diluter of the oxygen, which would be too stimulating if breathed in a pure state. The amount of the watery vapor with which the exhaled air is saturated may range from about 6 to 27 ounces in 24 hours, its usual range being between 7 and 11 ounces. It is not pure water, but holds in solution a considerable amount of carbonic acid and an albuminous substance in a state of decomposition, which, on exposing the fluid to an elevated temperature, occasions a very evident putrid odor. See BRONCHITIS; PNEUMONIA; TUBERCULOSIS.

The well-known anatomical divisions of the lungs, known as lobes, are composed histologically of an enormous number of little lobes or lobules. Each lobule is separated from surrounding lobules by connective tissue, and the lobules which come to the surface of the lung are often distinguishable as little polygonal areas. Each pulmonary lobule consists of a single terminal bronchus and the group of air cells and spaces connected with that bronchus. The terminal bronchus on entering a lobule divides into several branches known as alveolar ducts. These open into considerably larger cavities called infundibula, from the sides of which the air sacs or air cells open out like alcoves. The terminal bronchus is lined by a single layer of ciliated columnar epithelium. Outside of this are some elastic fibres and thin irregular bundles of smooth muscle cells. As the alveolar ducts are approached the ciliated epithelium is replaced by lower epithelium of the non-ciliated variety. In the alveolar ducts the epithelium is cuboidal, and the elastic tissue and smooth muscle are greatly reduced in amount. In the infundibulum



1. Trachea and bronchi. 2. Small bronchus showing air cell and lobule. 3. Ultimate bronchus of dog.

the epithelium consists mainly of large flat non-nucleated cells known as respiratory epithelium. Among these are scattered smaller polyhedral cells which are remains of fœtal life and are called embryonal cells. Elastic tissue forms the supporting framework of the air sacs and forms a distinct ring around the mouth of each sac. In addition to the elastic tissue there is usually a small amount of fibrous connective tissue and some connective tissue cells surrounding the air sacs. Besides the parts just described, which may be considered as the parenchyma of the lung, there are seen in all sections of lung tissue bronchi of various sizes. The smaller bronchi are lined with a single layer of columnar ciliated epithelium lying upon a basement membrane. Beneath the latter is the stroma of the mucous membrane, outside of which is a circular layer of smooth muscle, the whole being surrounded by a connective tissue or fibrous coat. In the medium size and larger bronchi a distinct submucous coat is present in which are imbedded the acini of mucous glands, while in the fibrous coat are situated various sized plates of hyalin cartilage. In the largest of the bronchi the epithelium, instead of consisting of a single layer, is made up of several layers, and there is an increase in the thickness of the muscularis mucosæ and of the fibrous coat.

The blood vessels of the lung belong to two distinct systems: one, the bronchial system, is for the nourishment of the lung proper; the other, the pulmonary system, is for the purpose of exposing the blood to the air in the lungs. Both systems of vessels enter the lung at the hilus accompanying the large divisions of the bronchus. Within the lung the pulmonary system of vessels give off branches which correspond to the divisions of the bronchi, and on reaching the septa between the infundibula, break up into an extremely rich network of capillaries which surround the air sacs. At the margins of the air sacs the blood from the capillary network enters the radicles of the pulmonary veins, which

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accompany the arteries to the surface of the lung. The bronchial system of vessels accompany the bronchial tubes and supply capillary networks to them and to the other structures of the lung. The lymphatics of the lung, like the blood vessels, consist of two sets. One of these originates in the lymph spaces of the interlobular connective tissue and in the subpleural lymph spaces, communicating by means of the latter with the surface of the pleura. The second set of lymphatics, the bronchial lymphatics, originates in the subepithelial lymph spaces of the bronchi, which communicate with the mucous surfaces of the bronchi and air sacs. From these spaces definite lymphatic channels are formed which follow the blood vessels to the surface of the lung and pass thence by means of a few large trunks to the bronchial lymph glands. The nerves of the lung come from both cerebro-spinal and sympathetic systems. The main nerve trunks enter the lung at the hilus and follow the branchings of the blood vessels and the bronchi. On arriving at the smaller bronchi the nerves break up into fine non-medullated fibrils which pass to the muscular tissue and to the mucous membrane.

RESPIRATION (in plants). A series of processes by which plants release the necessary energy for growth, movement, and similar work. Although the true nature of respiration was stated by Ingenhouss before the beginning of the nineteenth century and its relation to growth and the evolution of heat was clearly set forth by DeSaussure in 1824, confusion between photosynthesis and respiration has persisted to the present day.

The method of obtaining energy in the presence of free oxygen by oxidizing and decomposing materials within the body is known as normal respiration. The process of self-decomposition in the absence of free oxygen is known (inaptly) as intramolecular respiration; while the process of securing energy by the decomposition of the surrounding medium is designated as fermentation. Under ordinary conditions, almost all plants are able to absorb free oxygen from the atmosphere at all times. But if the absorption of free oxygen is impossible, the protoplasm may set up such changes in its own substance or in media adjacent to it as to secure the necessary energy by their decomposition. Some of the very simplest plants (anaërobic bacteria) have adapted themselves to this mode of life and flourish only in the absence of free oxygen. Others (bacteria, yeasts, molds, etc.) may live and grow in the presence of free oxygen, but when deprived of this actively decompose the substances with which they are in contact, which are then said to ferment or putrefy.

Normal respiration consists essentially of four independent processes: first, the absorption of oxygen; second, the union of oxygen with the substances to be oxidized; third, the decomposition of these substances, with the formation of various end products, differing according to circumstances; fourth, the elimination of these products. Its activity varies much with different plants and different parts of the same plant, and is influenced strikingly by external conditions. Considering only respiration occurring under favorable conditions, that of organs rich in protoplasm is more active than that of watery organs. Thus growing points (buds), flowers, seeds, and so on respire more actively than fleshy leaves and tubers. The respiration of water and marsh plants is in general less active than that of land plants. The rate of respiration in active plant organs is several times greater per unit of weight than human respiration. The most active respiration recorded is that of young wheat leaves, which consume in 24 hours one gram of oxygen for each 0.1 gram of their weight. In human respiration one gram of oxygen is consumed per 100 grams of weight. Active aërobic bacteria may consume 200 times as much oxygen as that used by man per unit of weight. When the oxygen pressure is reduced to one-third its normal, respiration is retarded. Under increased pressure the results differ according to the duration of exposure. For a short time plants may respire normally at two to six atmospheres of pure oxygen. Under a longer exposure to such pressures respiration is likely to be retarded. Variations in temperature, which are frequent in nature, exert a double effect; as the temperature rises more oxygen is absorbed and more CO_2 is eliminated. With rising temperature respiration does not, as most functions do, attain a maximum and then diminish with further increase of temperature, but it is accelerated until death ensues. Yet the respiratory rate does not increase in direct proportion to the increase of temperature. Light appears to have little or no effect upon respiration.

Intramolecular Respiration. The exclusion of oxygen from plants which normally use it produces a profound disturbance of the usual metabolism, as shown by the fact that the end products of respiration, instead of being chiefly carbon dioxide and water, are alcohol, hydrogen, organic acids, etc. For most plants, a period of intramolecular respiration seems to be a time to be tided over, growth ceases, and most other functions are suspended. After the decomposition of the protoplasm has gone to a certain extent, death ensues. Therefore, at high temperatures, which accelerate the process, intramolecular respiration suffices to maintain life for a shorter time than at low temperatures. See Fermentation.

RESPIRATION, Artificial. The exchange of air as in natural breathing (see Respiration, Organs and Process of), produced by mechanical means. Respiration is suspended when for any reason the muscles concerned in breathing are deprived of their wonted nervous stimulation, by poisoning of the nerve centres which govern them. This may take place in asphyxiation by poisonous gases, in drowning, poisoning, or by prematurely cutting off the placental circulation during parturition; and it is in these circumstances that artificial respiration finds its greatest usefulness. (See Asphyxia.) The object in resuscitation (q.v.) is to imitate as closely as possible the natural respiratory movements. These should be rhythmical and at the rate of twelve or fourteen to the minute. Several methods of carrying on artificial respiration have been devised. Of these the most generally useful is that of Sylvester. In this method the body of the person to be revived is placed upon the back, the shoulders being slightly elevated, and high enough to keep the chin from falling forward on the chest. The arms are then grasped

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just above the elbows, and raised gently and steadily upward and forward to their full extent, and at the same time rotated slightly outward. This position is maintained for two or three seconds and secures *inspiration*. The arms are now lowered and pressed firmly against the sides of the chest for two or three seconds, thus bringing about *expiration*. These movements are repeated in alternation with regularity and precision, at the rate above mentioned. Sylvester's method is the one generally employed to resuscitate the drowned. Before proceeding with artificial respiration in these cases certain preparations have to be made. To drain off water from the stomach and chest, the patient is stripped to the waist and placed face downward with the pit of the stomach raised above the level of the mouth by a roll of clothing or other material placed transversely beneath the trunk. Pressure is then made upon the patient's back. The tongue must be held out, the larynx kept open, and the mouth and throat cleared of mucus. In cases of drowning efforts to resuscitate should be continued for at least an hour, apparently inanimate individuals having been brought to life at the end of that time, after having been immersed half an hour or longer. Attempts to restore respiration should be supplemented by friction, the administration of stimulants, and the application of heat to the abdomen and lower extremities.

Schultz's method, applicable especially to the resuscitation of newly born infants, is as follows: The operator stands behind the patient. The shoulders are grasped, with an index finger in each armpit, the thumbs over the shoulders, and the rest of the fingers resting obliquely over the back. The whole weight of the child's body is now allowed to hang from the shoulders. This lifts the ribs, expands the chest, and produces mechanical inspiration. Expiration is produced by swinging the child forward at arms' length to a point where the lower limbs and pelvis topple over toward the operator, thus bringing about extreme flexion of the trunk, and forcing the abdominal viscera against the diaphragm. This motion is then reversed, and the process repeated at the rate of eight or nine times a minute.

In the method of Byrd-Dew the neck is supported by one hand, the thighs upon the other, the child lying upon its back. The head is allowed to fall backward so that the glottis may remain freely open. The body is then alternately extended and flexed, which movements determine respectively inspiration and expiration.

Fell's method of artificial respiration consists in pushing a tube into the larynx and trachea, and forcing warmed air into the lungs by means of a bellows. Expiration is secured by pressure on the sides of the chest.

Gibbons's method, which is applied by its author to cases of apparent death from electricity, consists of inserting one end of a tube into a nostril of the inanimate person and then, after closing the other nostril, working two bellows alternately so as to exhaust the air in the lungs and then supply fresh air under pressure.

Laborde's method depends on rhythmical traction of the tongue. This organ is seized, as far back as possible, between the thumb and index finger wrapped in linen, and alternately pulled forcibly forward and relaxed. This method is supposed to excite breathing by reflex action.

A practicable and very useful method especially for young children is mouth-to-mouth insufflation. A piece of gauze is laid over the mouth of the child and air breathed directly into its lungs from those of the operator.

RESPIRATORY SOUNDS. Sounds produced during inspiration and expiration as perceived by auscultation, either by placing the ear upon the chest or through the medium of the stethoscope (q.v.). When the ear is placed upon the chest of a healthy adult, a soft, rustling sound is heard, comparable to the sighing of a gentle breeze among the leaves. This sound is louder and more marked during the inspiratory act, which is in health longer than expiration in the ratio of 6:5. To this sound the name *vesicular murmur* has been given. Certain areas of the chest, where the large bronchi are nearer the surface, viz. over the sternum, the junction of the first costal cartilage with the sternum, and a diamond-shaped space at the back in the middle line, the sound becomes tubular, and higher pitched, and expiration and inspiration are of equal length. This is called bronchial breathing and is significant of disease when it occurs elsewhere than over the areas above indicated. Where these two sounds shade into each other, *broncho-vesicular* breathing is heard.

In pathological conditions of the lungs, the vesicular murmur undergoes many important modifications. It is, for example, diminished or completely obliterated in pleurisy (q.v.) with effusion and in pneumothorax; it becomes louder and higher in pitch over consolidated lung tissue such as occurs in pneumonia and pulmonary tuberculosis (q.v.). One of the earliest physical signs of phthisis is a prolonged respiratory murmur, and this alteration of the normal rhythm is also characteristic of asthma and emphysema (q.v.). Interrupted breathing, sometimes called *cog-wheel respiration*, is heard in healthy but nervous individuals, but in disease it is caused by the breaking of the column of air passing through the bronchials by tenacious mucus, or by the expansion of different lobes at different times.

Certain adventitious sounds to which the generic name *râles* is applied are heard in disease, and are produced either in the bronchial tubes or air vesicles. Dry râles are whistling, squeaking sounds, caused by the passage of air through bronchial tubes narrowed in places by swelling of the lining mucous membrane, as in bronchitis, or by spasm, as in asthma; or by tough, adherent mucus. Moist râles are produced by the expansion of previously closed air cells, or by the passage of air through fluid in the bronchial tubes or in a cavity. These are heard in tuberculosis, the resolving stage of lobar pneumonia, pulmonary œdema, etc. *Metallic tinkling* is a sharp, quick sound resembling that produced by striking a glass vessel with a pin. Its presence gives evidence of the presence in the lung of a cavity of considerable size containing air, and surrounded by firm walls. A *friction sound* is produced by the rubbing together of the visceral and parietal layers of the pleura when rough from inflammation, and is indicative of pleurisy. Consult Loomis's *Physical Diagnosis* (New York, 1902). See AUSCULTATION.

RESPIRATORY SYSTEM, COMPARATIVE ANATOMY OF THE. The system of organs that have the function, in the animal body, of taking in oxygen from the surrounding mediums (water

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and air) and of getting rid of carbon dioxide gas and certain other excrementitious products. In Vertebrata these organs are either gills or lungs. In invertebrates the skin always functions, more or less, as a respiratory organ, and in addition various other organs subserve this function also. Whatever form or position the respiratory organ may assume, it must be richly supplied with blood vessels so that the blood containing carbon dioxide may come in close relation with the surrounding medium. No organ may be spoken of as a respiratory organ which has not this vascular apparatus. Specialized respiratory organs do not appear in the animal kingdom until the segmented worms are reached, and even in many of the segmented worms no specific respiratory apparatus is developed. The integument of lower forms and sometimes the wall of the intestine, when this organ is present, perform the respiratory function; the integument is better able to do so, since it is the part that comes most intimately in contact with the surrounding media.

In echinoderms there are no respiratory organs that are homologous throughout the phylum. In holothurians this function is performed by the 'respiratory tree,' a mass of delicate branched tubules which open into the cloaca; by the oral tentacles; and by the entire body-wall. In the other forms various other organs perform this function.

Mollusks, as a rule, have one (in a few cases more than one) pair of breathing organs, the gills, which are covered and protected by the mantle. In some forms this gill is wanting and in others it is functionally replaced by other and phylogenetically newer organs. Blood flows into these gills and after taking in oxygen from the water it flows back again, first to the heart and then to all parts of the body. The lamellibranch gills appear double on account of the strong development of the two rows of branchial leaflets, and in some mollusks increased surface is obtained by a folding of the leaflets. Scaphopoda and many Gastropoda do not possess true gills. In certain cases they are replaced by adaptive gills. The latter may be delicate leaflets forming a rosette around the anus; or folds to the right and left in the mantle cavity; or cerata, the dorsal finger-like processes of Nudibranchiata. Some Pulmonata have become adapted for aërial breathing. In this case the mantle cavity is richly supplied with blood vessels in its dorsal wall and gains a respiratory aperture, the so-called 'lung.'

Respiration in all Crustacea takes place in the outer integument. In small Crustacea there are no specially developed respiratory organs, and respiration is performed by the entire body surface. In the large Crustacea certain parts of the body are adapted to perform this function more actively than others. To fit such parts of the body for a respiratory function folds of the integument arise and the soft skin of the folds is functional in respiration. When this fold is transformed into a hard shield, it serves to protect the delicate breathing organs. The function of respiration is performed in most Crustacea by the thoracic limbs. Some of the crabs live more or less on land and are adapted to retain water in the branchial cavity and to breathe air directly. In the latter case the part of the branchial cavity that functions as a lung has its integument modified into branched tufts which project into the air cavity and are well provided with vascular organs.

The respiratory organs of insects are segmentally arranged air-conducting tubules, the tracheæ, which connect with the exterior by means of segmental openings, the stigmata. These openings are often guarded by bristles or tufts to keep out foreign particles. Internally the tracheal tubes branch and subdivide again and again and penetrate all through the tissues of the body. The tracheæ are lined by chitinous spirals to keep the tubes open. This chitin is continuous with the chitin of the exoskeleton and is shed with the latter.

In Amphioxus more than the first half of the length of the alimentary tract is devoted to the purposes of respiration, since its walls are provided with gill-slits. This may be called the respiratory part of the alimentary tract (prosenteron) in contradistinction to the remainder, hinder portion, the digestive part. Gill-slits to the number of 100, more or less, are borne by it. The variability in number is due to the fact that gills continue to increase in number as the animal grows older, new ones being formed posteriorly. In Ammocetes, of the Cyclostomi, there is a muscular fold at the posterior end of the branchial part of the œsophagus. In Petromyzon that part of the œsophagus which contains the gills is entirely cut off from the alimentary tract and the cut-off end of the latter grows forward above the gill-portion to join the mouth cavity. Thus two canals pass backward from the mouth. From Elasmobranchii onward the gills are in close relation with the skeletal parts of the visceral arches. As a rule teleosts possess four gill-arches, but certain rudimentary gills on the mandibular and hyoid arches indicate that fishes formerly possessed more gill-arches than at present. Fishes take in water through the mouth, and by a constriction of the latter force it out through the gill-slits. During the process of breathing the gill-arches rise and fall. The Dipnoi, as the name indicates, breathe both by gills and by lungs. The lung-sac of the Dipnoi is an unpaired bilobed sac.

Lungs. The air-bladder and lungs have a similar development and the latter has developed from the former. Both are outgrowths of the alimentary tract; the air-bladder is usually formed on the dorsal, and the lung on the ventral side, however. The point at which the air-bladder arises from the œsophagus is not a fixed one, and the duct which connects the bladder with the œsophagus may remain open, may be reduced to a solid strand, or may eventually disappear altogether. In the last case the air-bladder probably gets its contained gas from its own wall. The air-bladder always lies above the alimentary tract. In a few cases it is paired. It may be transversely constricted to form several divisions, or cœcal processes may be present. The internal surface of the air-bladder of fishes may be spongy, a condition similar to that of the lungs of Dipnoi and Amphibia. The lungs of some of the Dipnoi show posteriorly a paired condition, although anteriorly there is only one part. The lungs of certain Amphibia (Menobranchus and Proteus) are lower in development than those of the Dipnoi in so far as their internal surface is smooth. In reptiles and in the other vertebrates the form of the lung is determined by that of the body.

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The lungs show a branched system of bronchi. In this respect the lungs of crocodiles and some other forms show a decided advance over those of Amphibia. The lungs of birds (q.v.) are in connection with large sacs, the 'air-sacs.' These air-sacs fill the interstices in the body cavity, pass between the muscles, under the skin, and even into the hollow bones.

In man the lungs of the two sides are not symmetrical; the right lung has three lobes, the left two. They are connected with the exterior by the air passages composed of the bronchial tubes, trachea, larynx, and windpipe. This system of organs arises on the ventral side of the œsophagus as a duct, and constricts off to form a distinct tube. The separation begins anteriorly. The lungs arise as lateral buds at the posterior end of the furrow. Cartilaginous supports first arise in Urodeles. Definite trachea appear in Sirenia, Amphiuma, and Gymnophiona. The cartilaginous bands take on the form of half rings first in the Gymnophiona. A differentiated larynx appears in the Anura, is regulated by muscles, and has vocal cords. The larynx of reptiles makes no advance over that of Anura, but in crocodiles and turtles the larnyx is imbedded in a depression of the hyoid. The thyroid cartilage of mammals is supposed to have been derived from a part of the hyoid. In birds two larynges are present, the lower of which, the syrinx, is the functional voice organ and is restricted to birds alone.

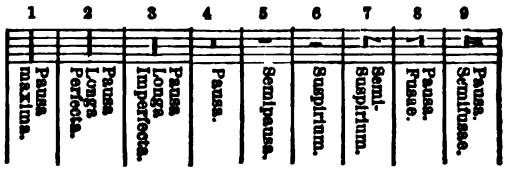
Consult: Lang, *Text-Book of Comparative Anatomy* (London, 1891-96); Weidersheim, adapted by W. N. Parker, *Comparative Anatomy of Vertebrates* (London, 1897).

RESPONDENT (from Lat. *respondere*, to answer, from *re-*, back again, anew + *spondere*, to promise). A party who is called upon to answer in proceedings against him in certain courts. A person who is sued in an admiralty court, or in a court of chancery or equity, is known as the respondent. In this sense the term corresponds to the word defendant. The term is also applied to one who opposes an appeal, and in that sense it is the opposite of appellant. In the English divorce courts the defendant is known as the respondent. See APPEAL.

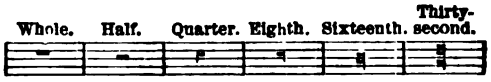
RESPONDENTIA (Neo-Lat., from Lat. *respondere*, to answer). A term employed in maritime law to denote a loan of money on the whole or a part of the cargo of a ship, and conditioned to be paid with 'maritime interest' when the cargo is safely delivered at the port to which it is consigned. A respondentia bond is commonly given as evidence of the contract. The lender of the money assumes the risk that the goods may be lost at sea, and if such casualty occurs he loses the amount he has advanced. If there is a partial loss the lender is entitled to have the goods which are saved sold for his benefit. The loan is practically only on the personal security of the borrower, as the goods may be sold by the latter free from any lien at any time during the voyage or upon their arrival. The advantage which accrues to the lender in consideration of the unusual risk he assumes is that he may contract for practically any rate of interest which the borrower is willing to pay. See BOTTOMRY BOND; USURY. Consult the authorities referred to under ADMIRALTY LAW.

RESSEL, rĕs'sel, JOSEPH (1793-1857). An Austrian inventor, born at Chrudim, Bohemia, and educated at Vienna and at Mariabrunn. In the latter place he studied forestry, and from 1817 until his death he held various posts in the Austrian Department of Forestry, being stationed for some time at Triest. Ressel was an able mechanic and invented several machines. His claims to the discovery of the screw propeller, which he did not patent, owing to an unfortunate accident at the trial trip of the screw steamboat, rival those of Sauvage, Ericsson, Smith, and Wilson. Consult Reitlinger, *Joseph Ressel* (Vienna, 1863).

REST (AS. *rest*, *ræst*, Goth., OHG. *rasta*, Ger. *Rast*, rest; ultimately connected with Skt. *ram*, to rest, to rejoice). In music, an interval of silence occurring in the course of a movement between one sound and another. With the use of mensurable music (q.v.), rests began to be represented by regular fixed signs, and finally the following values were one after another decided on:



Ultimately the tails of the shorter notes were reversed and thus our present rest characters came into use. The following are the principal rest characters:



For rests of a number of bars, it is now usual to draw one or two oblique lines across the staff, and write on them in figures the number of measures during which the voice or instrument is to be silent; thus 5 in common time, denotes a rest of 5 whole notes. A rest, like a note, may be prolonged by one or more dots.

REST-CURE. A system of treatment inaugurated about 1870, after the recognition of the success of Prof. Samuel Jackson, by Dr. S. Weir Mitchell (q.v.) of Philadelphia. It is calculated "to renew the vitality of feeble people by a combination of entire rest and excessive feeding made possible by passive exercise obtained through the steady use of massage and electricity." The cases most benefited by such treatment are those of women who are 'nervous,' thin, and anæmic, partial or entire invalids. Seclusion from relatives and friends; absolute rest in bed for six weeks or more; neither reading, writing, nor sewing, and often not raising the hand or turning over in bed without aid; massage of the entire body except the face every day for six weeks; the use of the induction current with slow interruptions over the whole of the body but the face and neck during forty to sixty minutes each day; together with large quantities of milk, cocoa, and malt extract combine to make up the treatment. While rest-cure is especially suitable to the thin, it also benefits cases of 'fat anæmia' and the large majority of neurasthenics. It has also been of great value in indigestion and

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alcoholism, and some early cases of tuberculosis. Rest-cure is employed in modified form by many physicians. Consult Mitchell, *Fat and Blood* (Philadelphia, 1877).

REST-HARROW. A popular name for several species of European herbs and sub-shrubs of the natural order Leguminosæ. Common rest-harrow (*Ononis arvensis*) is sometimes abundant in neglected pastures, but is easily controlled by cultivation. Yellow rest-harrow, or goat's rue (*Ononis Natrix*), is sometimes grown for ornament.

RESTIGOUCHE, rĕs'tē-gōōsh'. A river in the northwestern part of New Brunswick, Canada, forming for about 50 miles the boundary between that province and the Province of Quebec (Map: New Brunswick, B 2). It is 200 miles in length, and falls into Chaleurs Bay in the Gulf of Saint Lawrence. For the last 18 miles it is navigable for the largest ships.

RESTITUTION (Lat. *restitutio*, from *restituere*, to restore, from *re-*, back again, anew + *statuere*, to place, from *stare*, to stand). In law, return to the rightful owner of property which has been unlawfully detained. The term is applied alike to cases where the property has merely been converted to the use of some one under a claim of title, and where it has been stolen. In the United States, where there is doubt as to the identity of the property, the issue should be decided by a replevin action. (See REPLEVIN; EXECUTION.) The term is also applied to the restoration of a part of a cargo which has been lost by jettison. See MARITIME LAW.

RESTORATION (Lat. *restauratio*, from *restaurare*, to restore, from *re-*, back again, anew + **staurus*, Gk. σταυρός, firmly fixed, stake; connected with *stare*, to stand, Skt. *sthāvara*, fixed, *sthā*, to stand). A term employed in the history of England and France in connection with the reëstablishment of monarchial government. In England it is applied to the accession of Charles II. In France the term is applied to the accession of Louis XVIII. in 1814, after the abdication of Napoleon (First Restoration), and after the 'Hundred Days' in 1815 (Second Restoration).

RESTORATIONISTS. A sect which, under a new name, has revived a very ancient doctrine, which has found advocates at all times since the days of Origen (q.v.). One of the most remarkable doctrines of that Father was his belief of a general *apokatastasis*, or 'restoration' of all things, in which, after a purgation proportioned to the various moral conditions of their souls at the time of death, all men, however wicked, and all the evil angels, even Lucifer himself, would be restored to the favor of God, and reunited to Him in heaven. This doctrine was condemned at the time, and has since been repeatedly rejected by the churches of the East as well as of the West. The doctrine has been renewed in more than one form since the Reformation by various classes, who have taken the name of Universalists (q.v.). The particular title of Restorationists was given in the United States to the followers of the Rev. Hosea Ballou (q.v.), who, in addition to the tenet above explained, held that all retribution is confined to this life, and taught that at the resurrection all men will be admitted to everlasting happiness.

RESTORATION OF PAINTINGS. store a painting to its original condit delicate operation, requiring great knowl skill. By the operation of ignorant rest the past many of the most important p have been destroyed; indeed, it is a whether restorers have not inflicted more than time itself. In former times the was chiefly one of repainting and it w that the chief damage was done, even the artist himself was often a man of One of the most difficult tasks of the moc storer is to remove these outer coatings o

The first step in the process of restora to clean the picture—i.e. to remove the coa dust with which it has become encrusted, varnish originally applied, which in the of time becomes dust color or opaque. The process is to dissolve the varnish by me brandy, weak alcohol, or some similar sub applied with the sponge, oil also being freq applied to prevent deleterious action upo colors. In Germany the process invented b celebrated Bavarian chemist Max von P kofer (q.v.) is often applied, which consi subjecting the painting to cold fumes of al Unvarnished paintings are in like manner fully washed with brandy, vinegar, or some lar substance.

The transferring of a painting from a dam canvas, panel, or wall is effected by gluing a paper plaque fastened on gauze. The ca or wood is then carefully removed by mean instruments and chemicals, and the paintin glued to a new canvas, after which the pape removed from the surface of the painting. case of a fresco the paper is rolled upo cylinder while the plaster is being removed w a chisel. The retouching of the parts of painting damaged during the restoration w dry color is an important process, which sho be intrusted to most skillful hands. The gl plates now used instead of varnish in most m ern galleries, though superior as a protection the painting, have the disadvantage of preventi the study of the ensemble of the picture their reflective powers.

RESTRAINT OF TRADE, CONTRACTS I It has always been regarded as contrary to t policy of the common law that one should d prive himself of the right to engage in busines or trade, and all contracts entered into for tha purpose have with certain limitations been re garded as illegal and consequently null and void Thus a contract that one would never engage i his business or trade within ten miles of London was deemed valid and enforceable, but a contract not to engage in any particular trade or business in England for five years was considered illegal as against public policy. The later tendency of the English courts is to test the validity of the contract by its reasonableness in view of all the circumstances of the case irrespective of any arbitrary rule as to time and space. The early decisions of the United States followed the early rule of the English courts. Later decisions recognize that the United States constitute practically one country for purposes of trade, and consequently do not hold contracts in restraint of trade invalid when the restraint extends over an entire State, or indeed over nearly all of the United States. The Sherman Act of 1887, which

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is applicable, however, only to persons and corporations engaged in interstate commerce, forbids pools or combinations for the division of traffic. The modern tendency in the United States is, as in England, to make the test of reasonableness of the restraint depend on the character of the business and the special circumstances of the case. Contracts for the purpose of creating so-called corners in the market of any commodity of general or necessary use have always been held void as unlawfully restraining trade, and contracts unreasonably in restraint of commerce are deemed void on the same principle. See TRUSTS.

Congress, acting under the constitutional power to regulate commerce, has passed an act known as the Sherman Act (26 U. S. Statutes at Large, 209) declaring that all contracts and combinations in restraint of interstate or international commerce are illegal and void. In construing these statutes the United States Supreme Court has held that all contracts directly restraining commerce, interstate or international, whether such restraint be reasonable or unreasonable, are illegal, thus changing the common-law rule, that the restraint must be unreasonable in order to invalidate the contract. See CONSPIRACY; COMBINATION; COMMERCE; MONOPOLY; STRIKES; TRUSTS.

Consult the authorities referred to under CONTRACT; and Jolly, *Contracts in Restraint of Trade* (2d ed., London, 1900); Matthews, *Covenants in Restraint of Trade* (London, 1893); Shelling, *Trusts and Monopolies* (Boston, 1893); Stickney, *State Control of Trade and Commerce* (1897).

RESTREPO, rā-strā'pō, JOSÉ MANUEL (c.1775-c.1860). A South American historian and politician, born in New Granada (Colombia). He wrote *Historia de la revolución de la república de Colombia* (1827), which includes an appendix containing several original documents. As he took a personal part in the events described, the work has an especial value, and it is written in a judicious and impartial style. Restrepo was Secretary of State under Bolivar.

RESTRICTIVE COVENANTS. Covenants in conveyances which bind the purchaser to use the land conveyed thereby in some particular way, or which prohibit him from making use of it for certain designated purposes. Common examples of such covenants are: the restrictive clauses in deeds prohibiting purchasers from building beyond an imaginary 'house line' on the land, that is, within a certain distance from the street; or prescribing the character of the buildings which they shall be permitted to erect thereon. Restrictive covenants create equitable easements in favor of the owner of the land for the benefit of which they are made; and "run with the land," that is, continue to operate in favor of all subsequent owners of that land. It is by restrictive covenants that the character of the improvements on real estate in suburban towns and additions is fixed. The class of people, the character and minimum cost price of buildings, and the purposes for which they may be used, may thus be regulated. Consult Washburn on *Real Property*, and on *Easements*; Jones on *Easements*.

RESURRECTION (Lat. *resurrectio*, from *resurgere*, to rise again, from *re-*, back again, anew + *surgere*, *surrigere*, *subrigere*, to rise, from *sub*, under + *regere*, to direct, rule). The restoration of man after death to the full possession of his powers and faculties. In one form or another, this conception is found among Mazdayasnians, Jews, Christians, and Mohammedans. As to the time, manner, and subjects of the future change there has been much difference of opinion. While the prevailing view has generally been that the dead will rise simultaneously on the last day, there are great religious teachers who have regarded the resurrection as taking place in the case of each person immediately upon death. The resurrection has been conceived of as an awakening from the sleep of death; a reanimation of the body; a restoration of the body by the coming together of the particles that constituted it at the moment of death; a creation of a new body in harmony with the perfected spiritual character; a clothing of the departed spirit with a spiritual body descending from heaven; or a development of the germ of a spiritual organism already existing within the physical body before death. Some have maintained that all men, regardless of nationality, religious belief, or character, will be raised from the dead, while others have held that only members of a particular nation, the adherents of a certain form of religion, or the possessors of a good character will be deemed worthy to share in the resurrection.

Whether the idea of a resurrection originated with Zoroaster, already existed before his time in Iran, or was developed by his disciples cannot be determined with certainty. In its most concrete form it is met in the later parts of the Avesta (q.v.) and in the Bundahish. Here all men are to be raised on the last day by the Saoshyant (q.v.), or Saviour, and those who are living at that time are to be endowed with immortality, the bodies of the dead being brought together from the different elements in the course of fifty-seven years. It is on the whole most probable that there existed a popular belief in a future resurrection already before the time of Zoroaster. The custom of leaving the dead in the field to be consumed by wild beasts, without building for them a house, goes back to extreme antiquity. While such a practice might seem to preclude ancestral cult and the hope for immortality, the unimpeded return of the body to the different elements of nature apparently made the worship of ancestral spirits less a matter of ceremony, and in connection with the idea of a coming destruction and renovation of the world, led the Iranian mind to expect a reconstruction of each human being from its constituent parts scattered among the elements. That this occurred at a very early period is rendered probable by the emphasis put upon the future life by such Iranian peoples as the Scythians and the Thracians, who must have left the common home at a remote epoch. We have positive evidence that this doctrine was taught in the Achæmenian period in a work of Theopompus, the historian of Philip of Macedon, used and quoted by Diogenes Laertius, Æneas of Gaza, and probably Plutarch. Herodotus and Xenophon probably also heard of it, though they emphasized only the belief in immortality on the part of the Persians.

In early Hebrew thought there is no trace of this conception. It is unknown alike to prophets, legislators, and poets. The third chapter of Genesis no doubt reflects the attitude of large

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circles in Israel; if man had been allowed to remain in the Garden of Eden he might have continued his existence indefinitely by the magic virtue of the life-giving fruit; but as he was driven out of the garden, he returns to dust and is no more. Nevertheless, the survival of ancestral worship and necromancy shows that to many minds there were exceptional personalities rising above the average lot of the shades in Sheol (q.v), still possessing high rank, power over the living, and supernatural insight. The valley of bones in Ezekiel xxxvii. does not suggest, but rather precludes, familiarity with the doctrine of a resurrection. In Job xix. 25-27 the text has evidently suffered much in transmission, but the whole trend of the thought clearly shows that there can be no reference to either a life beyond or a resurrection. The possibility of such a return to life is emphatically denied in chapter xiv. The first reference in Hebrew literature to the resurrection is found in the Book of Daniel, written in B.C. 165. According to Daniel xii. 2, some of those that sleep in the dust are to be raised. Evidently the Maccabean martyrs and the apostates are intended. An apocalypse written c. 110 B.C. and preserved in Isaiah xxvi. declares that Yahweh's dead shall live and his dead bodies shall arise, for his dew is a dew of healing and the earth shall cast forth the dead. Whether all Israelites are meant is uncertain. Within the canonical Old Testament these are the only passages that show an acquaintance with the doctrine. How long before the year B.C. 165 it became known in Israel we have no means of determining. In the earliest part of the Book of Enoch, written c.108 B.C., there is an allusion to some who are neither slain on the judgment day nor raised from the place of torture (xxii. 13). The resurrection is apparently limited to righteous Israelites. This is clearly the conception in Enoch xci. 10; xcii. 3-5, written c.88 B.C.; in the Psalter of Solomon iii. 12, xiii. 11, xiv. 9, xv. 13, written c.60 B.C.; in II. Maccabees vii. 9, 14, 23, 29, 36, xii. 43, 44, written c.20 A.D.; and in the Testaments of the Twelve Patriarchs, Jude xxv., and probably originally in Benjamin x. A number of apocalyptic works written apparently in the reign of Domitian seem to contemplate a universal resurrection. This is most clearly the case with IV. Ezra vii. 32; probably also with Baruch xlii. 7, l. 2, li. 1 (though in xxx. the resurrection is limited to the just), and with Enoch li. In the Apocalypse of Moses, which in reality is a life of Adam and Eve, the resurrection of the whole human race is clearly taught (x., xiii., xxviii., xli., xliii.), the addition "all that are a holy people" in xiii. being probably an interpolation; also in Sibylline Oracles ii. 214-237, written c.200 A.D. The prevailing view, however, in the Talmudic and Midrashic period was that the heathen would not rise from the dead, but that the resurrection would be only for the righteous. Whether this would include all Israelites was a mooted question, the opinion being frequently expressed that some classes would be excluded. Thus the Mishna tract *Sanhedrin* xi. 1 excludes from the world to come those who deny the resurrection of the dead and the divine origin of the law as well as the Epicureans, while it records the opinions of Rabbi Akibah, who excluded also those reading non-canonical books, and of Abba Shaul, who added any person pronouncing properly the name of Yahweh (see JEHOVAH), and *Kethubhoth* 111 b distinctly states that "the people of the land [i.e. the unlearned] shall not be raised to life." Before the third century A.D. the resurrection is always a work of God Himself. But Rabbi Samuel taught in the name of Rabbi Jonathan that the righteous would raise the dead (*Pesachim*, 68). Later it was held by many teachers that the Messiah would raise the dead. The general opinion was that resurrection would occur in Palestine. Even the Jews who had died outside of the holy land were supposed to be led through subterranean passages to Palestine, where they were to be raised (*Pesiktah rabbath* i.). Many supposed that of the human body one bone would never molder into dust, and that from this 'almond of the spine,' or *os sacrum*, the resurrection body would be formed (*Bereshith rabba* xxviii.).

There probably never was a time when the belief in a resurrection was universally held in Israel. While it was championed in one form or another by the Pharisaic party, it was strongly opposed in many circles. It is not known or accepted by the authors of Ecclesiasticus, Judith, Tobit, and I. Maccabees, and it is of course emphatically denied by Ecclesiastes. The Sadducees adhered to the old idea of Sheol and rejected the doctrine of a resurrection. The Samaritans seem to have maintained the same attitude in earlier times, though they subsequently accepted the doctrine. (See SAMARITANS.) The Essenes cherished a view concerning the nature of the soul and the future life closely resembling that of the Pythagoreans, ultimately due to Indian or Persian influences, according to which the soul has existed before birth and will exist eternally after its bondage to the body is ended. A similar view was held by Jewish Gnostics. Where Greek thought prevailed the idea of immortality (q.v.) was accepted rather than that of a resurrection. This may be seen not only in the Wisdom of Solomon iii. 1-9, iv. 7, v. 16, vi. 20; IV. Maccabees xvii. 5, 18, xviii. 3; and Philo, *De vita Mosis* ii. 633, *De Abr.* 385; *De Somn.* 586; *De migratione* 407, but also in Palestinian works like Jubilees xxiii., xxv., and Slavonic Enoch lxv. 8, 9, 10, lxvi. 7. Even where the term was kept, the idea of a resuscitation of the physical body was abandoned, as by Josephus (cf. especially *Bel. Jud.* iii. 8, 5) for the thought of an endowment with a spiritual organism. As a result of contact with Arabic learning, there was an unmistakable tendency to substitute the doctrine of a natural immortality of the soul for that of a resurrection of Israel only. It was not wrongly that Maimonides was accused of having set aside completely the doctrine of a resurrection in his *More Nebuchin* or "Guide of the Erring." Modern Judaism has been largely determined in this as in other respects by Moses Mendelssohn, whose work, *Phädon oder über die Unsterblichkeit der Seele* (1767), made a profound impression on his age.

The attitude of Jesus on this question cannot be determined with certainty. Aside from Luke xiv. 14, which, if genuine, shows that Jesus looked forward to a recompense at the resurrection of the just, there is but one saying of His recorded in the Synoptic Gospels that has any direct relation to the subject. This is found variously reported in Matthew xxii. 23-32, Mark xii. 18-27, and Luke xx. 27-38. Jesus evidently rejects the view of the Sadducees on the ground

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that they do not understand the Scriptures and fail to appreciate the power of God. On the other hand, He clearly does not accept the current Pharisaic doctrine of a resurrection on the last day, since He based His argument for the fact that the dead are raised on the words of Yahweh to Moses in which He speaks of Himself as the God of Abraham, Isaac, and Jacob. The point of the argument is that, according to the Scriptures, these patriarchs were addressed as living several centuries after their death, and therefore must have been raised from the dead; and the natural inference is that Jesus believed in a spiritual resurrection by which those to whom God stands in relation as their God are immediately after death raised into life to be in His presence forever. Concerning those who shall be accounted worthy to share in the resurrection, He further stated His conviction that they would neither marry nor be given in marriage, but be like the angels. His warning, "Fear ye him who is able after he has killed to slay both body and soul in Gehenna," also seems to indicate that He limited the resurrection to those who should be accounted worthy. See GEHENNA; HELL.

A new assurance of a resurrection to a blessed life beyond was given to those who became convinced that Jesus had been raised from the dead. Unless it can be proved that certain of the older Epistles ascribed to Paul are not genuine, there is positive evidence that not much more than twenty years after the death of Jesus a glorious figure appeared in a vision to Paul and was identified by him as the crucified Nazarene and that Paul had heard of similar visions seen by Peter, James, and others (I. Cor. xv. 4-8). This conviction revolutionized Paul's life and caused him to see in the resurrection of Jesus the guarantee of an eternal life and the sole reason for righteous conduct in this life. While the important passage in I. Corinthians xv. contains no intimation of an empty tomb, and cannot be pressed as proving a physical resurrection or an appearance to women, the earliest Gospels, Matthew and Mark, written in the main before the end of the first century, suggest that Jesus first appeared to His disciples in Galilee, and that some women had found the tomb empty, but said nothing about this because of fear. The later Gospels, Luke and John, make Jerusalem the place of the first appearance of Jesus to His disciples and strongly emphasize the physical character of the resurrection body while ascribing to it functions impossible to a physical body.

In the conflict with Gnosticism, which denied the resurrection, the Church found it necessary to give added emphasis to the resurrection of the flesh. Hence the earlier creeds, which simply affirmed a belief in a resurrection or an eternal life, were gradually changed into the formula 'the resurrection of the flesh,' found in the Apostles' Creed. Since the thought of a resurrection of the wicked as well as the good sporadically occurs in the New Testament (as in John v. 28, Acts xxiv. 15, Heb. vi. 2, Rev. xx. 13), the idea of an interval between a first resurrection of believers and a second resurrection of the rest of mankind developed, and was especially cherished by those who looked forward to a thousand-year period of Messianic rule. See MILLENNIUM.

Through the influence of Greek philosophy the doctrine of the natural immortality of the human soul (see IMMORTALITY) became so important a part of Christian thought that the resurrection naturally lost its vital significance, and it has practically held no place in the great systems of philosophy elaborated by Christian thinkers in modern times.

The doctrine of the resurrection was adopted by Mohammed from Jewish or Christian sources and adhered to both by Sunnites and Shiites. It was subjected to grave doubts by Moslem thinkers in the times of the Bagdad caliphate, but is to-day generally accepted.

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RESURRECTION. A sombre and powerful novel by Tolstoy (1899), treating of the problems of Russian life of to-day, and arraigning especially the Russian judicial prison system. The theme is the repentance of a nobleman who as a juryman is called on to try a girl whom he had previously ruined. Impressed with the injustice of their relative conditions, he gives up his life to atonement with the result that both he and his victim are regenerated.

RESURRECTION PLANT. See ROSE OF JERICHO.

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RESUSCITATION (Lat. *resuscitatio*, from *resuscitare*, to raise again, revive, from *re-*, back again, anew + *suscitare*, to raise, from *sus-*, *sub-*, up, under + *citare*, to call, rouse). The revival of the apparently dead. The apparently dead to whom efforts to restore are of use are those asphyxiated by drowning, by breathing illuminating gas, or by suffocation, and those suffering from syncope or the effects of electricity. In syncope, or fainting, the head and heart should be placed on a low level, while the lower extremities are elevated. If this manipulation is not rapidly successful, respiration may be excited by sprinkling the face suddenly with water and applying to the nostrils some pungent volatile substance such as spirits of camphor or weak ammonia. Victims of electric shock may sometimes be resuscitated by the use of artificial respiration by means of Gibbons's instrument. This consists of two bellows so arranged that one pumps air into the lungs through a nostril while the other exhausts the lungs of respired air. In the case of asphyxiation from inhaling either illuminating gas or carbonic dioxide, artificial respiration should be employed together with administration of oxygen through the nostril. Apparently drowned persons may often be resuscitated by syphoning the water out of the stomach and then using artificial respiration and keeping the body warm by means of artificial heat. See HALL, MARSHALL; RESPIRATION, ARTIFICIAL.

RESZKE, rĕsh'ke, EDOUARD DE (1856—). A Polish opera singer, brother of Jean de Reszke, born at Warsaw. After studying with his brother, he received instruction from Ciaffei, Steller, Coletti, and Sbriglia. Originally he had studied scientific farming in Silesia, and had devoted himself to the care of the family estates. It was at the suggestion of Jean, then in the first flush of his success, that he took up the study of music. He made his first public appearance in 1876 at the Italiens in Paris, as the King in Verdi's *Aïda*, which was so successful that Massenet intrusted to him the creation of *Le roi de Lahore* at La Scala in Milan. From 1880 to 1884 he sang with the Royal Italian Opera Company in London, where he became famous as one of the greatest dramatic bassos of his time.

RESZKE, JEAN DE (1853—). A Polish dramatic tenor, born at Warsaw. Through the influence of his father, a prominent State official, and his mother, who was possessed of remarkable musical talent, he saw much of the world's great artists, the family salon possessing an attraction for the most celebrated musicians of the day. When but twelve years of age, De Reszke was singing in the Cathedral, where the quality of his voice aroused the interest of the city. Afterwards he took up the profession of law, and obtained his degree and license. But the attraction of music proved too strong, and he began to study for the stage under Ciaffei and Cotogni. In 1874 he made his début at Venice, as Alfonso in *La Favorita*, under the name of De Reschi. Soon afterwards he appeared in London in the same rôle, where the critics complained that his voice lacked the deep quality and resonance of a barytone. He attained considerable celebrity, however, but his physical strength began to suffer from the wear and tear of singing parts too low for him, and acting upon the advice of Sbriglia, he retired from the stage, and prepared himself in a tenor repertoire. On the completion of two years of study he made his second début before the public, in 1879, this time in the tenor rôle of *Robert le Diable*, at Madrid. His success was instantaneous, and his career a continuous artistic triumph. His repertoire includes *Faust*, *Lohengrin*, *L'Africaine*, *Aïda*, *Le Cid* (written for him by Massenet), *Les Huguenots*, *Elaine*, *Romeo and Juliet*, and *Tristan*. He is conceded to be one of the most artistic singers and actors known to the operatic stage. Since 1891 both De Reszkes have, with short interruptions, been favorite members of the Metropolitan Opera House Company in New York.

RETAINER (from Lat. *retinere*, to retain, hold back, from *re-*, back again, anew + *tenere*, to hold). The employment of an attorney, counselor, or other legal practitioner, to prosecute or defend an action, or represent a person, in his professional capacity. It is not necessary that a retainer be in writing; a mere verbal request is sufficient. Upon being retained an attorney has full powers incidental to professional representation. The term is also applied to a fee paid to a legal practitioner for his services, usually in advance, and constituting only a part of his whole fee. See ATTORNEY; COUNSELOR.

The act of an executor, to whom the estate is in debt, in retaining in his hands a sufficient amount to satisfy his claim, is also technically known as retainer.

RETAINER. See LIVERY.

RETAINING WALLS. Walls built to retain earth or other incoherent substances in positions and forms which, without such artificial aid, they could not maintain. Most earths, if left to themselves, will not stand with vertical sides, but will fall or slide down until they assume a certain slope. The angle which this slope makes with the horizontal is called the 'angle of repose,' and it varies according to the nature of

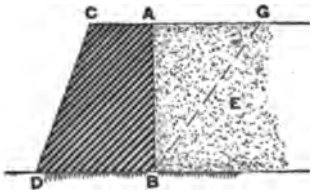

DIAGRAM OF RETAINING WALL.

the material, the amount of water it contains, etc. The same earth will have different angles of repose under different conditions. In the accompanying figure, E represents a section of a mass of earth which it is desired to retain by the wall ABDC. If the line BG represent the angle of repose, then it is evident that the duty of the retaining wall is to keep in position the wedge-shaped mass of earth ABG. This mass tends to destroy the retaining wall, (1) by overturning it by rotation along the front edge D; (2) by the crushing of the stone along the front edge; and (3) by sliding the wall forward on its base, DB, or along some horizontal plane above the base. In designing a retaining wall the engineer seeks to fix its dimensions so that it is safe against destruction by any or all of these

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destructive tendencies. The difficulty of doing this arises from the fact that the pressures exerted by the wedge-shaped mass of earth vary so greatly with the character and physical condition of the material that they can only be roughly approximated. Engineers have worked out numerous formulas for calculating the dimensions of retaining walls, which are designed to meet the varying conditions of the load, but these formulas have to be based on so many hypotheses that their practical value, except for general indications, is quite limited. The greatest difficulty arises from the action of water, which accumulates behind the wall and may transform the earth to a semi-fluid state, thus enormously increasing its pressure, and one of the chief desiderata in retaining-wall construction is that this water shall be kept drained away. This is usually accomplished by having drainage holes, commonly called 'weep holes,' through the wall at intervals, by means of which the water runs off as fast as it accumulates.

Retaining walls are generally made trapezoidal in section, as shown by the diagram, but they are also built with rectangular sections and with concave faces. Danger from crushing seldom exists except in very high walls, and danger from shifting can be easily avoided by laying the masonry with its courses dipping slightly from the front toward the rear. Careful workmanship and perfect drainage are the essentials of good retaining-wall construction.

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RETALIATION (from Lat. *retaliare*, to retaliate, from *re-*, back again, anew + *talis*, such). Properly, the return of like for like; usually, the infliction upon a wrong-doer of an evil similar to that which he has wrought. In early law, when wrongs are redressed by the act of the injured party or kinship group, such redress often takes the form of retaliation. The retaliatory idea sometimes assumes peculiar forms: as when the man whose father has been slain seeks to slay in return not the offender himself, but the offender's father. The clearest expression of the *lex talionis*, or law of retaliation, is found in the Jewish rules, "An eye for an eye and a tooth for a tooth," and "Whoso sheddeth man's blood, by man's hand shall his blood be shed." In the Roman XII. Tables *talio* is authorized as a penalty for mayhem (*membrum ruptum*) if the injured party refuses to accept pecuniary compensation. Retaliation is sanctioned in the Visigothic laws, but this (according to Brunner, who asserts that there is practically no retaliatory element in old German law) was due to the influence of the Old Testament. A modern parallel was afforded in colonial Connecticut, where the penalty of castration was imposed in at least one instance on the authority of the Mosaic rule.

When public punishment begins to take the place of private vengeance, penalty may be, and often is, measured according to the degree of wrath which the offense commonly arouses, but purely retaliatory penalties tend to disappear. To punish a perjurer by hewing off the hand which he has raised in swearing, or a slanderer by cutting out the tongue, is not properly retaliation. Such penalties may originate in a sort of personification of the offending member, or they may be based, as Brunner suggests, on the desire to make the relation of crime and punishment obvious: "the penalty itself is to declare why it is imposed." Retaliation may be based, in part, on this idea, but such symbolic penalties are not in themselves retaliatory. More closely akin to retaliation is the infliction upon a false accuser of the penalty which would have been inflicted on the accused if the charge had been sustained.

The term retaliation is sometimes loosely employed to describe the return of evil for evil even when there is no similarity between the offense and the punishment. In this broad sense, retaliation includes all extra-legal vengeance and all legal punishment. It is in this sense that we speak of 'the retaliatory theory' of punishment, meaning the theory which bases the right of the community to punish criminals on the fact that they have injured the community by their crimes.

RETBERG, rĕt'bĕrk, RALF VON (1812-85). A German writer on art, born at Lisbon, where his father was then stationed as a captain in the German-English Legion. From 1829 to 1845 Retberg served as an officer in the Hanover Army, and then settled in Munich. His works are of especial value for the knowledge of art and culture at Nuremberg, and include: *Nürnberger Briefe zur Geschichte der Kunst* (1846); *Nürnbergs Kunstleben in seinen Denkmalen* (1854); *Kulturgeschichtliche Briefe* (1865); *Albrecht Dürers Kupferstiche und Holzschnitte, kritisches Verzeichnis* (1871). Posthumously, *Die Geschichte der deutschen Wappenbilder* (Vienna, 1888) was published from his manuscripts.

RETENTION (Lat. *retentio*, from *retinere*, to retain, hold back), or CONSERVATION. In psychology, the effect which is left upon the organism by psychophysical processes. One is said to retain one's experiences and to 'live them over' again and again. Retention is, therefore, the presupposition of memory. In Herbartian psychology (see HERBART) ideas are supposed to maintain their existence even after they have left consciousness. But most recent writers on psychology regard retention as a physical function. It is, they assert, the brain that 'retains.' This view is based partially on the observation of pathological cases, which reveals the fact that both general and specific disturbances of memory are connected with definite changes either in the cortex as a whole or in some limited area of it. (See APHASIA.) These pathological facts have told us something of the 'seat' of retention. Lesions in one region of the cortex affect retention of visual sensations and ideas; lesions in another region, that of auditory sensations and ideas. There is, however, still much doubt as to the extent of the differentiation of cerebral functions. Concerning the actual physiological changes which are left over from excitation there is also some difference of opinion. Most psychologists agree, however, that the activity which a stimulus produces ceases with the passing of the stimulation, but that some kind of modification remains.

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Wundt maintains that the exercise of nervous elements leaves a tendency toward repetition of the same function whenever the same elements are reëxcited.

The conditions under which retention takes place are both general and special. The general conditions are health, plasticity of the nervous system (retention is much easier in childhood and youth than in old age), mental disposition, attention, and the formation of associations. Among special conditions influencing retention stand emotion and mood; vividness, intensity, and duration of the impression; repetition and the concreteness or abstractness of the material composing the experience.

BIBLIOGRAPHY. Wundt, *Physiological Psychology* (Leipzig, 1893); Kuelpe, *Outlines of Psychology* (New York, 1895); Ribot, *Diseases of Memory* (ib., 1882); Bain, *Senses and Intellect* (ib., 1888); Maudsley, *Physiology of Mind* (ib., 1883); Ladd, *Elements of Physiological Psychology* (ib., 1892). See MEMORY; MENTAL CONSTITUTION; REPRODUCTION OF IDEAS.

RETENTION OF URINE. A lack of power to evacuate the bladder. This may be either complete or partial. It should be carefully distinguished from *suppression*, in which there is a failure on the part of the kidneys to secrete urine, and consequently the bladder is empty. The causes of retention may be *organic* or *functional*. Among the chief organic causes are: (1) Urethral stricture, (2) injuries resulting in contraction or rupture of the urethra, (3) tumors within the urethra or pressing upon it from without, (4) foreign bodies in the urinary canal, such as small calculi, clotted blood, pieces of bougies, catheters, etc., (5) enlargement of the prostate gland, acute or chronic, especially in aged men, abscesses in the perinæum, the pressure of a loaded rectum, the head of the child during labor, or pelvic tumors of any kind. The functional causes of retention are spasm of the urethra or the neck of the bladder, partial or complete paralysis of the bladder, and hysteria.

The symptoms of retention consist of an urgent desire to pass water, with partial or entire inability to accomplish the desire; restlessness, discomfort, and even violent pain accompany the straining efforts to evacuate the bladder. On percussion above the brim of the pelvis, the bladder is found to be distended in proportion to the amount of accumulated urine. If relief is not speedily afforded the bladder may give way and discharge its contents into the peritoneal cavity, in which case death soon follows; or the urethra behind the stricture may give way, and the urine be extravasated into the surrounding tissues, provoking severe inflammation and gangrene.

Treatment will depend in its details upon the cause operative in each case. Only general principles can be given here. Spasmodic retention can nearly always be relieved by warm baths, heat to the perinæum, purgation, sedatives, or in extreme cases by a few whiffs of chloroform. Attempts should be made to draw off the urine through a small catheter. If this measure fails, recourse must be had in a few hours to aspiration of the bladder, through a hollow needle thrust into it through the abdominal wall above the pubes. This measure, however, is rarely necessary. Paralysis of the bladder may arise from the general weakness of old age, from a depressed state of the nervous system in fevers of the typhoid type, in spinal disease, apoplexy, etc. Retention from paralysis is often accompanied by a dribbling away of the urine, so that it may at first be mistaken for incontinence. In chronic prostatic cases the urine has to be regularly drawn off with the catheter.

RETHEL, rā'tĕl, ALFRED (1816-59). A German historical painter. He was born near Aix-la-Chapelle, May 15, 1816. His artistic training began at the age of thirteen under Schadow in the Düsseldorf Academy; but, dissatisfied, he repaired in 1836 to Frankfort to work under Philip Veit and Schwind. At Düsseldorf he had earned reputation with episodes from the life of Saint Boniface, one of which (1832) is in the National Gallery in Berlin, and in Frankfort he painted a "Nemesis" (1837); a "Daniel in the Lions' Den" (1838, Städel Institute); "Guardian Angel of Emperor Maximilian" (fresco, ib.); "Resurrection" (Church of Saint Nicholas); the portraits of Emperors Maximilian I. and II., Charles V., and Philip of Suabia, for the Römer (1838); "Saints Peter and John Healing the Lame" (1840-41, Leipzig Museum); and "Finding of the Body of Gustavus Adolphus" (Stuttgart Museum). In the competition for a cycle of eight frescoes from the life of Charlemagne to adorn the city hall at Aix-la-Chapelle he carried off the first prize, and after a visit to Italy (1844-45), executed (1847-52) four of the subjects, to wit: "Otho III. in the Tomb of Charlemagne;" "Destruction of the Irminsul;" "Defeat of the Saracens at Cordova;" and "Conquest of Pavia in 774." The cartoons for these are in the National Gallery, Berlin, and the cycle was afterwards completed from Rethel's designs by Josef Kehren. This monumental work, imbued with the spirit of grandeur and simplicity, was the greatest achievement of historical painting in Germany during the first half of the nineteenth century. Attacked by a nervous disease, Rethel in vain sought relief in a second visit to Italy in 1852-53, and died insane at Düsseldorf, December 1, 1859. A series of six water colors depicting the "Expedition of Hannibal Crossing the Alps" (1844-45), and his illustrations to the "Dance of Death" (1848, with poetical text by Reinick, 13th ed. 1902), deserve special mention. His brother and pupil, OTTO (1822-92), who also studied under Karl Sohn and Schadow at the Düsseldorf Academy, painted at first Scriptural subjects, such as "Boaz Meeting Ruth" (1855, Leipzig Museum), and afterwards chiefly portraits and genre scenes. For Alfred Rethel's biography, consult: Müller von Königswinter (Leipzig, 1861); Valentin, in *Aesthetische Schriften*, i. (Berlin, 1892); *Art Journal* (London, 1865); and Pecht, *Deutsche Künstler*, ii. (Nördlingen, 1879).

RÉTIF DE LA BRETONNE, rā'tēf' de là bre-tŏn', NICOLAS EDMÉ (1734-1806). A French novelist, nicknamed by Grimm the 'Gutter-Rousseau,' born in Sacy. The discovery of his love-letters to another woman than his wife in 1765 led to the first recognition of his literary talent. From the first his fiction was the work of observation and largely of personal experience. Its success was gradual, but steady. *Le pied de Fanchette* (1769) made him known, *Le paysan*

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perverti (1775) made him famous and sought by distinguished men. Of his other writings the *Monsieur Nicolas* and the 42 volumes of *Les contemporaines* (1780-85) are most noteworthy. The novels are declamatory and rhetorical, but they offer the first serious treatment of the petty bourgeois in fiction. A fair idea of his manner and merits may be obtained from Assezat's selection (3 vols., Paris, 1875).

RETIMO, rā'tē-mō. A seaport town of the island of Crete, on the north coast, 38 miles west of Candia (Map: Greece, F 6). Population, in 1900, 9311.

RETINA. See EYE.

RETINITIS (Neo-Lat., from *retina*, so called because like fine network, from Lat. *rete*, net). Inflammations of the retina are primary or secondary to inflammation of other parts of the eye. Both eyes are usually affected. Sight is impaired, the size or form of objects seems altered, the field of vision is contracted; there is a feeling of discomfort in the eyes and at times dread of light. The ophthalmoscope shows a fundus hazy from swelling, tortuous, and dilated veins, a disk with indistinct margins, sometimes hemorrhages. Recovery may be complete or partial. Atrophy of the retina and the optic disk may result in loss of sight partially or completely. Treatment includes absolute rest of the eyes with protection from light, use of atropine locally, and constitutional treatment of the cause of the retinitis. This depends upon the variety. *Simple retinitis* may result from overuse of the eyes in any way or may be the beginning of other forms. *Albuminuric retinitis*, which occurs during nephritis, is characterized by the presence in the retina, in addition to hemorrhages, of white spots. At the macula lutea these are often arranged in a star-like form. Treatment is that of the kidney disease. *Diabetic retinitis* presents a picture similar to the preceding form, but with the white spots arranged irregularly around the macula, and the treatment is directed to the cause. *Syphilitic retinitis* occurs in the hereditary form and in the secondary stage of acquired syphilis. The fundus is hazy, the disk red and hazy; there are scattered grayish and white spots, often with pigmented borders, especially near the macula, and white marks along the vessels. The course is slow, relapses frequent, and though early and thorough treatment of the constitutional disease gives good results, there is likely to be some permanent diminution of vision. *Hemorrhagic retinitis*, as its name indicates, is characterized by the occurrence of numerous hemorrhages. It occurs in persons with diseases of the arteries and heart, and frequently precedes cerebral hemorrhage. Treatment of the arterial disease is very important. *Leukæmic retinitis* causes pallor of the disk with white and yellow spots, sometimes with a pink border, and hemorrhage areas.

RETINOSPORA. A tree. See CYPRESS.

RETIREMENT (from *retire*, from OF., Fr. *retirer*, to draw back, from *re-*, back + *tirer*, to draw, from ML. *tirare*, to draw). A statutory provision or age limit by which officers in the military or naval services cease from active duties, and are placed on the retired list. In the United States Army the compulsory age limit is sixty-four, but the President may retire an officer at sixty-two. In the United States Navy the retiring age is sixty-two years. Army regulations provide that when an officer becomes disabled or unfitted for the performance of duty by reason of wounds, sickness, or improper habits, a retiring board will convene and action be taken according to the verdict. Officers on the retired list are permitted to wear the uniform of their actual or highest brevet rank when retired, except that the number or insignia of the regiment, corps, or department will not be worn. Retired officers receive 75 per cent. of pay (salary and increase) of their rank. A limited number may be assigned at their request to duty with full pay to militia or schools as instructors, or in time of war to other duty. In the British Army officers are permitted to retire voluntarily with gratuities or pensions, and are also obliged to retire according to age limit (which varies according to rank held), or after a period of non-employment, on half pay. Regulations similar in effect obtain in all countries.

RETORSION (ML. *retorsio*, *retortio*, a bending or twisting back, from Lat. *retorquere*, to bend or twist back, from *re-*, back again, anew + *torquere*, to twist). A term of international law signifying an act of retaliation by one nation against another. Unlike reprisal (q.v.), it is not a sufficient justification for war, but is rather a political measure intended to compel one nation to accord equality of treatment to the subjects of the other residing within its jurisdiction. Thus, where one nation imposes restrictions upon aliens residing within its territory, as by unequal taxes, or by differential import duties, or fails to observe the rules of international comity, as by refusing to grant the accustomed privileges to ambassadors and other diplomatic agents, the aggrieved nation is justified in applying the same kind of treatment to the offending nation or its subjects. The increasing commercial relations of modern States have greatly extended the field in which the principle of retorsion may be applied, and it is now most frequently resorted to by those nations which depend largely upon tariffs or import duties for their revenue.

RETREAT (OF. *retrete*, *retraicte*, Fr. *retraite*, from ML. *retracta*, retreat, from Lat. *retrahere*, to draw back, from *re-*, back again, anew + *trahere*, to draw). In military tactics and strategy, a retirement before, or in the face of, an enemy. It is one of the most difficult as well as important manœuvres of modern warfare. The most important feature of the retreat, and the one on which rests its ultimate success, is the rear guard (q.v.). In barrack, army post, or camp life and routine in the United States Army, the bugle call 'retreat' signifies sunset, and is played by the field music (See BUGLE AND TRUMPET CALLS.) There is usually a parade or roll-call at that hour known as the evening parade, at which time extra duty details, guards or pickets, are paraded and go on duty. The ceremony of the retreat is observed throughout the armies of the world and is usually accompanied by gun fire and the lowering of the national color, which is hoisted again at reveille (q.v.).

RETREAT. A term used in the Roman Catholic and Anglican churches to designate a time of temporary retirement from active life

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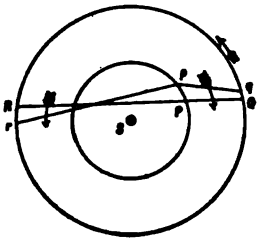
for the sake of prayer, meditation, and spiritual exercises. The practice is very ancient in the Church, as a following of the practice of Christ himself. The stricter retreats, especially those which the clergy of most Roman Catholic dioceses make every year, involve the giving up of the whole time to spiritual exercises, and usually silence is observed during them; but in the case of those who cannot leave their employment, services in the early morning and evening are provided; in their case the order of observances does not materially differ from that of a mission (q.v.).

RETRENCHMENT (from *retrench*, from OF. *retrencher*, *retrancher*, Fr. *retrancher*, to cut off, from *re-*, back + *trancher*, to cut, from Lat. *truncare*, to lop, from *truncus*, maimed). A defensive work in military fortification. It closely resembles the redoubt (q.v.) in construction and is usually built across the gorge of a redan or bastion, or from shoulder to shoulder, when it is apprehended that the salient angle may fall into the hands of the enemy. See FORTIFICATION; REDAN; REDOUBT.

RETRIEVER. A dog used in hunting aquatic birds. See FIELD DOG.

RETROACTIVE (from Lat. *retroactus*, p.p. of *retroagere*, to turn back, from *retro-*, back + *agere*, to do, act, drive) or RETROSPECTIVE LAWS. These terms are used interchangeably to denote statutes which apply to a state of facts which existed before their enactment. Retroactive laws that are of a criminal or penal nature are specifically known as *ex-post-facto* laws, and are expressly forbidden by the United States Constitution. The Constitution also prohibits laws impairing the obligations of contracts. With these exceptions Congress, or the legislatures of the various States, are free to enact retrospective statutes whenever they may deem it advisable to do so. Although retroactive laws are in disfavor where they have the above effect, there are many which are necessary to remedy defects in the law theretofore existing. For example, statutes making valid deeds of married women executed within a certain time prior to their passage, or conveyances which did not bear a certain stamp required by law at the time of their execution, may have a most salutary effect. See EX-POST-FACTO LAWS; LAW; STATUTE; INTERPRETATION.

RETROGRADE (OF. *retrograde*, Fr. *rétrograde*, from Lat. *retrogradi*, to go backward, from *retro-*, back + *gradi*, to walk). A term applied to the motion of the planets among the fixed stars when they appear to move in the *reverse* order of the signs of the zodiac (q.v.). All the planets move in the same direction round the sun, and therefore apparent retrograde motions must be due to their motion *relative* to the earth. In the case of comets, however, we have instances of motion about the sun in the opposite direction to that of the planets, and in such orbits the motion (referred now to the sun, not to the earth) is said to be retrograde. In the case of the planets, let S be the sun, and let the two circles represent the orbits of two planets. First, let the planets be, at P and Q, toward the same side of the sun. The planet nearer the sun has of course the greater velocity, and therefore, if *p* and *q* represent their positions after the lapse of a given time, P*p* is greater than Q*q*, and therefore the *direction* of the line *pq* (in which one is seen from the other) has rotated in the *opposite* direction to that in which either planet revolves about the sun. Hence, when a superior planet is in opposition (i.e. if Q be Jupiter, and P the earth), it *appears* to move backward among the stars. When an inferior planet is between the earth and sun (i.e. if Q be the earth, and P Venus), it *appears* to move backward also. If the planets be on opposite sides of the sun, as at P and R in the figure, let *p* and *r* be their positions after a given time; then *pr* has turned from the direction PR in the direction in which the planets revolve about the sun. Hence any planet, superior or inferior, appears to move *directly* when the sun is between it and the earth. Between these two opposite cases, there must, of course, be points at which the apparent motion is neither retrograde nor direct—then the planet is said to be *stationary*. This case occurs whenever, for an instant, the lines PQ and *pq* are parallel; that is, when the two planets are moving with equal velocities transverse to the line joining them, these velocities being parallel, and toward the same side of the joining line.



RETURNING BOARDS. In the United States, official bodies designated by law for canvassing the results of popular elections. The general rule is that a returning board in canvassing the returns sent to it acts in a ministerial capacity and must leave the correction of error or fraud to the courts unless the return be void on its face, in which case, of course, the returning board must reject it. The board for canvassing the returns of State elections usually consists of certain designated State officers including the Secretary of State and the Attorney-General. In some States the returns are canvassed by the presiding officers of the Legislature in the presence of the two Houses. In the case of members of the Legislature the returns are usually sent to the Secretary of State, though sometimes to a returning board, but all contests are decided by the Houses themselves in pursuance of a constitutional privilege everywhere allowed. In the case of local officers contested returns are settled by the courts acting as a canvassing authority, or in a *quo warranto* proceeding. In the case of Presidential electors Congress provided by the Act of 1887 that disputed returns in any State might be settled by such organs and according to such procedure as State law might provide. If this be not done within six days of the meeting of the electors, the two Houses of Congress have the final determination of the election.

RETZ, rĕts, GILLES DE LAVAL, Seigneur de. See BLUEBEARD.

RETZ, rĕs, JEAN FRANÇOIS PAUL DE GONDI, Cardinal de (1614-79). A French politician and author, born at Montmirail. His early education was intrusted to Saint Vincent de Paul, and he

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later attended the Jesuit College at Clermont. It is said that he was compelled by his family to enter the Church in the expectation that he would become Archbishop of Paris, a position which had been held by two members of his house. He was brilliant in his studies, but dissolute in private life. He engaged in political intrigues with the Count of Poissons, but after the death of that nobleman resumed his theological studies and was made coadjutor of the Archbishop of Paris in 1643 by Louis XIII. He devoted himself to his duties with zeal and won popularity by his profuse distribution of alms. At the time of the Fronde (q.v.) he was at first of great assistance to the royal cause, but soon aroused the distrust of the Court, and became the leader of the popular party, displaying consummate talents for intrigue. In 1651 he became reconciled with the Queen mother, Anne of Austria, and with her aid he succeeded in obtaining a cardinal's hat. After the return of the Court to Paris, in 1652, a mission to Rome was offered to Gondi which he seemed disinclined to accept. Mazarin was determined that his rival should be silenced, however, and managed to have Cardinal de Retz arrested and imprisoned at Vincennes. The Cardinal thereupon resigned the Archbishopric of Paris, which had come to him by the death of his uncle, and was allowed to retire to Nantes, whence he made his escape to Spain (1654) and repaired to Rome. There, in spite of his previous renunciation, he again claimed the Archbishopric of Paris, and in 1662 he succeeded in bartering the Archbishopric for profitable benefices. At the same time he became reconciled to Louis XIV. and returned to France, but abstained from further political intrigue. He sold his estates, paid his heavy debts, and devoted his life to charity and religion. His *Œuvres*, which cover the years 1643-55, are described by Voltaire as displaying the grandeur, impetuosity, and inequality of genius. They are not, however, trustworthy, on account of political bias. The best edition of his works is that by Feillet in the *Collection des grands écrivains de la France* (Paris, 1870-96). Consult: Chantelauze, *Le cardinal de Retz, étude historique* (Paris, 1878); id., *Le cardinal de Retz et ses missions diplomatiques à Rome* (ib., 1879).

RET'ZIUS, MAGNUS GUSTAV (1842—). A Swedish histologist, born in Stockholm. He was for some time professor of histology and anatomy in the Caroline Institute. His printed works on anthropology include: *Finska Kranier* ("Finnish Skulls," 1872); *Biologische Untersuchungen* (1880-81); and *Gehörorgane der Wirbelthiere* (1881-84). With Prof. Axel Key he published *Studien in der Anatomie des Nervensystems und des Bindegewebes* (1875). In 1890 he became editor of the *Biologische Untersuchungen.*

RETZSCH, rĕch, MORITZ (1779-1857). A German painter and engraver. He was born in Dresden, December 9, 1779, and studied at the academy of his native city, where he became a professor in 1824, and died July 11, 1857. Although treating romantic subjects, he belongs to the followers of Mengs. His chief celebrity rests upon his illustrations in outline of the great German poets, Schiller, Goethe, etc., whom he interpreted with great vigor and sympathy. His etchings of Goethe's *Faust* (26 plates, 1884) are particularly well known, not only in his own country, but also in France and England. Among other important works are the outline illustrations of Schiller's *Lied von der Glocke* (43 plates, 1884); his *Shakespeare Gallery* (80 plates, 1860); and his outline drawings of Bürger's *Ballads* (15 plates, 1872). His oil paintings, treating classical subjects, are of little interest, but he succeeded better with portraits.

REUCHLIN, roik'lĕn, JOHANN, known also by the Greek form of his name, CAPNIO (1455-1522). The first humanist of Germany and one of the earliest promoters of Hebrew studies in that country. He was born at Pforzheim, in Baden, February 22, 1455. He began his studies at his native place, continued them at Freiburg, and in 1473 accompanied Prince Frederick of Baden to Paris, where he made the acquaintance of Johann Wessel (q.v.) and began to study Greek. The next year he went to Basel, where he took his bachelor's degree in 1475 and his master's in 1477. He then revisited France, studied law at Orleans and Poitiers, and gave lectures in Greek and Latin. In 1481 he established himself at Tübingen as teacher of jurisprudence and literature. He entered the service of Eberhard, first Duke of Württemberg, accompanied him to Italy in 1482, and was employed in a number of public services. He visited Italy again in 1490. In 1492 the Emperor made him a count of the German Empire, and about the same time he began the study of Hebrew under a learned Jew who was Imperial physician. In 1496, after Eberhard's death, he went to Heidelberg, and made a third visit to Italy in the service of the Elector Palatine in 1498. At Rome he applied himself with renewed vigor to the study of Hebrew and Greek. He returned to Württemberg in 1499, and in 1502 was made a member of the Swabian confederate tribunal, retaining the office till 1513. In consequence of a quarrel between Ulrich, Duke of Württemberg, and the Swabian League, he went to Ingolstadt in 1519 and taught Greek and Hebrew at the university. When the plague broke out at Ingolstadt two years later he returned to Tübingen, intending to devote himself exclusively to study, but soon fell sick, and died at Liebenzell, June 30, 1522. Reuchlin is justly regarded as the father of Greek and Hebrew studies in Germany. He had great ability as a teacher, and, although for most of his life he held no professorial chair and was not always free to lecture openly, nevertheless he directed and encouraged the study of both languages in his generation. His devotion to Hebrew was the cause of the most interesting and important incident of his life. In 1510 one Johann Pfefferkorn, a baptized Jew, called upon princes and subjects to prosecute the religion of his fathers, and especially urged the Emperor to burn or confiscate all Jewish books except the Bible. Reuchlin remonstrated, maintaining that only books directly written against Christianity should be destroyed. This attitude drew upon him the enmity of the Dominicans, and particularly of the Inquisitor Jakob van Hoogstraten (q.v.). Reuchlin's opponents controlled the universities of Paris, Louvain, Erfurt, and Mainz; but many of the distinguished and independent thinkers of Germany were on the side of the scholar. Ulrich von Hutten and Franz von Sickingen in particular gave him support and pro-

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tection, the latter threatening Hoogstraten and the monks with terrible vengeance if they did not cease to persecute "his teacher, Doctor Reuchlin, that wise, experienced, pious, and ingenious man." The *Epistolæ Obscurorum Virorum* (q.v.) was an outcome of the contest. While there was much in Reuchlin's character and experience to draw him toward the Reformation, he never openly joined the movement, and late in life declared against Luther. Melanchthon was his great-nephew. Reuchlin's works include editions and Latin translations of Greek texts: a *Vocabularius Latinus Breviloquus* (1475); a manuscript Greek grammar (not published; the *Rudimenta Linguæ Hebraicæ* (1506), which, with pardonable pride, he declares to be "the first attempt to execute a grammar of the Hebrew tongue," and made "without any foreign help;" *De Accentibus et Orthographi Hebræorum Libri III.* (1518); an edition of the seven Penitential Psalms (1512), the first Hebrew book printed in Germany; *De Verbo Mirifico* (1494); and *De Arte Cabbalistica* (1517), works on the Cabbala; *Scenica Progymnasmata* (1497), and *Sergius* (1507), Latin satirical comedies, not without humor and literary merit; the *Augenspiegel* (1511; ed. by Mayerhoff, Berlin, 1836), a reply to a book by Pfefferkorn (the *Handspiegel*). Two of Reuchlin's Greek treatises, the *De Quatuor Idiomatibus* and *Colloquia græca*, have been published by Horawitz under the title *Griechische Studien* (Berlin, 1884). The best biography of Reuchlin is Geiger, *Johann Reuchlin; sein Leben und seine Werke* (Leipzig, 1871); consult also: id., *Johann Reuchlins Briefwechsel* (Tübingen, 1875); Horawitz, *Zur Biographie und Korrespondenz J. Reuchlins* (Vienna, 1877); Holstein, *J. Reuchlins Komödien* (Halle, 1888); Strauss, *Ulrich von Hutten* (6th ed., Leipzig, 1895), for the controversy about the Jewish books.

REULEAUX, rē'lō', Franz (1829—). A German mechanical engineer, born at Eschweiler, near Aix-la-Chapelle, where his father had machine shops. After finishing his apprenticeship in Koblenz, he worked in his father's shops, studied at Karlsruhe, and for a year was head of a factory in Cologne. Then he taught in Zurich (1856-64) and in Berlin (1864-96), where from 1868 until retirement he was director of the Industrial School. Reuleaux was intimately connected with German machinery exhibits at Philadelphia in 1876 and at Sydney and Melbourne (1879-81). His *Briefe aus Philadelphia* (1877) voice a sharp criticism on German methods of construction and especially on the lack of artistic design. To remedy this fault Reuleaux gathered a great collection of kinematic models in Berlin. His works are: *Konstruktionslehre* (with Moll, 1854-62); *Der Konstrukteur* (1860-62, and often); *Kurzgefasste Geschichte der Dampfmaschine* (1891); and *Thomassche Rechenmaschine* (2d ed. 1892).

REUMONT, rē'mōn', Alfred von (1808-87). A German historian. He was born at Aix-la-Chapelle, studied at Bonn and Heidelberg, and in 1832 traveled through Greece and the Ionian Islands. In 1835 he entered the diplomatic service, and subsequently was Minister Resident in Italy, principally at the Papal Court. His historical works include: *Ganganelli, seine Briefe und seine Zeit* (1847); *Beiträge zur italienischen Geschichte* (1853-57); *Die Jugend Katharinas de' Medici* (1854); *Die Gräfin von Albany* (1860); *Zeitgenossen* (1862); *Geschichte der Stadt Rom* (1867-70); *Lorenzo de' Medici il Magnifico* (1874); *Geschichte Toscanas* (1876-77); *Vittoria Colonna* (1881); and *Charakterbilder aus der neueren Geschichte Italiens* (1886). Upon art he wrote biographies of Michelangelo (1834), Andrea del Sarto (1835), and Benvenuto Cellini (1847), and other works.

REUNION, Chambers of. See Louis XIV.

RÉUNION, rā'ū'nyōn', Ile de la, formerly called Ile de Bourbon. An island in the Indian Ocean belonging to France, and situated 400 miles east of Madagascar and 100 miles southwest of Mauritius, in latitude 21° S., longitude 55° 36′ E. (Map: Africa, K 7). It is of nearly regular oval shape, 34 miles long by 22 miles broad, and has an area of 775 square miles. It is entirely of volcanic origin, and very mountainous, with numerous extinct craters, the highest peak being the Piton des Neiges, with an altitude of 10,069 feet. In the region known as the Pays Brûlé rises the only active volcano, the Piton de la Fournaise, 8713 feet above the sea. The plateau composing the island is fissured on all sides by deep cañons through which numerous mountain torrents run to the sea. The climate is generally pleasant and healthful, but the island is occasionally visited by devastating hurricanes. The flora and fauna resemble those of Madagascar. There are luxuriant tropical forests.

Over one-third of the total area is under cultivation. The principal products are sugar, vanilla, coffee, cacao, and spices. The imports and exports in 1900 amounted to $4,250,825 and $3,367,850 respectively. About 60 per cent. of the exports consists of sugar, and about 90 per cent. of the total commerce is with France and the French colonies.

The administration of the colony is in the hands of a Governor, who is assisted by a privy council and an elective council-general. The island is represented by one Senator and two Deputies in the French Parliament, and its towns are administered under the municipal code of France. The local budget for 1901 balanced at about $900,000, and the subvention from France amounted to over one-half of the revenue. The population in 1897 was 173,192, including over 15,200 Indian coolies, 4500 natives of Madagascar, about 9000 Africans, and nearly 1000 Chinese. The white population is far from pure. The capital is Saint-Denis.

The discovery of the island at the beginning of the sixteenth century is usually assigned to the Portuguese navigator Mascarenhas, after whom it was named originally. It was acquired by France in 1649. From 1810 to 1815 the island was held by Great Britain. Consult: *Annuaire de l'Ile de la Réunion* (Saint Denis, annually); Oliver, *Crags and Craters: Rambles in the Island of Réunion* (London, 1896); Garsault, *Notice sur la Réunion* (Paris, 1900); Hermann, *Colonisation de l'Ile Bourbon et fondation du quartier Saint-Pierre* (ib., 1901).

RÉUS, rā'ūs. A town of Catalonia, Spain, in the Province of Tarragona, five miles northwest of the town of Tarragona (Map: Spain, F 2). The principal buildings are the Gothic Church of San Pedro, rebuilt in 1512-69,

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with a high octagonal tower, and the handsome modern Fortuny Theatre. There are also a large hospital, several colleges, and an academy of fine arts. Cotton-spinning, which was introduced by English manufacturers in the latter part of the eighteenth century, and silk-spinning are the principal industries. The exports are wines, fruit, grain, and confectionery. Population, in 1887, 28,780; in 1900, 26,220.

REUSCH, roish, FRIEDRICH (1843—). A German sculptor, born at Siegen. He studied in Berlin at the Academy and under Albert Wolff, whom he assisted on the equestrian monument to Frederick William III. After his return to Berlin from a visit to Italy in 1874, he fashioned the marble group of "Market-Traffic" (1879) for the Belle-Alliance Bridge, and the "Genius of Steam" for the Technical Academy at Charlottenburg. In Königsberg, where he was appointed professor at the academy in 1881, he executed the large group of "Strength, Justice, and Moderation" for the Government building, the statues of "Albert, First Duke of Prussia" (1891), and of Emperor William I. (1894), both outside the royal palace, besides several other memorials, many busts and decorative figures for public buildings. At Siegen are a "Soldiers' Monument" (1877), the equestrian statue of "William I." (1892), and a bronze statue of "Bismarck" (1900), and there are also several charming mythological genre groups to his credit.

REUSS, rois. Two sovereign principalities of Germany, situated between the Prussian Province of Saxony, the Kingdom of Saxony, Bavaria, and some of the Saxon duchies, and separated from each other by the outlying district of Neustadt of the Grand Duchy of Saxe-Weimar (Map: Germany, D 3). They are: Reuss Elder Line, or Reuss-Greiz, and Reuss Younger Line, or Reuss-Schleiz. Reuss-Greiz covers an area of 122 square miles and is largely mountainous. Its principal products are woolens and knit goods. The Constitution of 1867 provides for a legislative assembly of 12 members, of whom three are nominated by the Prince, two by the nobility, three elected by the towns, and four by the rural districts. The capital is Greiz. The principality is represented by one member in the Bundesrat and sends one deputy to the Reichstag. Population, in 1900, 68,287, almost entirely Protestants.

Reuss-Schleiz consists of a number of detached parcels of territory with a total area of 319 square miles. It is a mountainous country with deposits of marble and salt. The chief manufactures are woolen and cotton goods, machinery, musical instruments, and leather. The legislative body consists of 16 members, of whom three are elected by those paying the highest taxes, and 12 by the rest of the qualified voters, the head of the House of Reuss-Köstritz being an hereditary member. The executive and in part the legislative powers are vested in the Prince, who is assisted by a cabinet of three members. The principality sends one member to the Bundesrat and one deputy to the Reichstag. The population in 1900 was 138,993, almost entirely Protestant. The capital is Gera. Consult: Mauke, *Heimatskunde des Fürstentums Reuss* (Halle, 1877); Gaul, *Beiträge zur Landeskunde des Fürstentums Reuss* (Greiz, 1900).

REUSS, EDUARD WILHELM EUGEN (1804-91). An Alsatian Protestant theologian. He was born at Strassburg, July 18, 1804, was educated at the seminary of his native town, studied theology and Oriental philology at Göttingen, Halle, and Paris, and took orders in the French Protestant Church. He returned to Strassburg as privat-docent, was made professor extraordinary at the university in 1834, and held different positions there till 1888. He died April 15, 1891. His principal works are: *Die Geschichte der heiligen Schriften des Neuen Testaments* (1842; 6th ed. 1887; Eng. trans. 1884); *Histoire de la théologie chrétienne au siècle apostolique* (1852; 3d ed. 1864; Eng. trans. 1872-74); *Histoire du canon des Saintes Ecritures* (1862; Eng. trans. 1884); *Die Geschichte der heiligen Schriften des Alten Testaments* (1881; 2d ed. 1890). He was one of the editors of the great edition of Calvin's works (59 vols., 1869-1900), and published a complete French translation of the Bible with commentaries (19 vols., 1875-81). Consult the memorial address by Lobstein (Strassburg, 1891).

REUSS, RODOLPHE (1841—). An Alsatian historian, born in Strassburg and educated there, at Jena, at Berlin, and at Göttingen. He became professor at the gymnasium of Strassburg in 1865, and after the Franco-Prussian War resumed this position, retiring from the Protestant seminary. From 1872 to 1896 Reuss was librarian of the Strassburg library. In 1896 he was appointed professor at the Ecole des Hautes Etudes in Paris. His historical writings in both French and German deal with Alsace; among them are: *Beiträge zur Geschichte des dreissigjährigen Krieges im Elsass* (1868); *Vieux noms et rues nouvelles de Strasbourg* (1883); and the important *Alsace au XVIIIème siècle* (1897 et seq.).

REUTER, roi'tĕr, CHRISTIAN (1665-1712). A German author, born at Kütten, near Halle. He was a witty and gifted writer, and was especially effective in character delineation. In his *L'honnête femme; oder die ehrliche Frau zu Pfissine* (1695) he skillfully uses Molière's fable in *Les précieuses ridicules*. His chief work is the novel *Schelmuffskys Reisebeschreibung* (1696), which was reëdited by Schullerus in 1885, and his other writings include *Der ehrlichen Frau Schlampampe Krankheit und Tod* (1696) and *Letztes Denk- und Ehrenmahl der Frau Schlampampe* (1697), which were republished in 1890.

REUTER, FRITZ (1810-74). A German humorist, who wrote in Low German (Plattdeutsch). He was born at Stavenhagen, in Mecklenburg-Schwerin, and was educated there and at Rostock and Jena, where he was arrested for political agitation (1833), and condemned to death, a sentence commuted to thirty years' imprisonment. He was confined in various fortresses till 1840, when he resumed legal studies at Heidelberg, afterwards managing his father's estate till 1850, when he became a private tutor at Treptow in Pomerania. Here he first began to write Low German sketches in prose and verse, the first volumes of which, *Läuschen un Rimels* (1853), showed such charming blending of humor and pathos in anecdotes and genre pictures as to achieve an immediate success, which was confirmed by the reception of *Polterabendgedichte* (1855) and *De Reis' nah Belligen* (1855). In 1856 Reuter moved to Neubrandenburg and gave

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himself wholly to writing. The best of his many volumes are *Schurr-Murr* (1861) and *Olle Kamellen* (1860-66). This latter contains the partly autobiographical *Ut mine Festungstid* and *Ut mine Stromtid* (his greatest work), and the vigorous picture of Germany in 1813, *Ut de Franzosentid*, with other work of less value. In 1863 Reuter moved to Eisenach, where he died, July 12, 1874. Reuter is one of the most realistic of the greater German writers. It is the realism of the Dutch genre painters, minute, good-humored, bourgeois, as artistic in pathetic as in comic scenes. Reuter's works are in 13 volumes (Weimar, 1863-68), with two volumes of *Remains* and *Biography* (ib., 1875), and a comedy, *Die Drei Langhänse* (1878). Consult: Glagau, *Fritz Reuter und seine Dichtungen* (2d ed., Berlin, 1875); Ebert, *Fritz Reuter, sein Leben und seine Werke* (Güstrow, 1874); Romer, *Fritz Reuter in seinem Leben und Schaffen* (Berlin, 1895).

REUTER, Hermann Ferdinand (1817-89). A German theologian, born at Hildesheim. He studied in Berlin and Göttingen; in 1843 became lecturer in the University of Berlin; from 1853 to 1876 was successively professor at Breslau, Greifswald, and again at Breslau; and in 1876 was called to Göttingen. His writings in Church history show thorough and scholarly research, and his criticisms are well grounded and clearly expressed. His publications include *Geschichte Alexanders III. und der Kirche seiner Zeit* (1845-64) and *Geschichte der religiösen Aufklärung im Mittelalter* (1875-77). He founded the *Zeitschrift für Kirchengeschichte*, in which he published his *Augustinische Studien* (1876).

REUTER, Paul Julius, Baron (1821-99). A pioneer in the business of news-gathering, born at Cassel, Germany. He was connected with the electric telegraph system from its earliest establishment in Europe, and was the first to organize a central bureau for the systematic collection and dissemination of telegraphic news. This office was opened at Aix-la-Chapelle in 1849. In 1851 he transferred his office to London. Reuter established agencies in all parts of the world to supply him with news; and, by using all available means of communication, and serving all papers impartially, he built up a noteworthy news service. In 1865 he transferred his business to a limited liability company, of which he was manager until 1878. In the same year he obtained from the Hanoverian Government a concession for the construction of a cable line between England and Germany. The title of baron was conferred upon him by the Duke of Saxe-Coburg-Gotha in 1872.

REUTLINGEN, roit'ling-en. A town in the Kingdom of Württemberg, Germany, on the Echatz, at the foot of the Swabian Alps, 20 miles south of Stuttgart (Map: Germany, C 4). The thirteenth-century Gothic church, partly rebuilt in 1844, is now undergoing a thorough restoration. There are a gymnasium, a weaving school, a school of women's work, and a pomological institute. The town is an important centre of the yarn, woolen, cotton, and cloth industry. In 1240 Reutlingen became a free Imperial city. Subsequently it was a member of the Swabian League, and was annexed to Württemberg in 1803. Population, in 1890, 18,542; in 1900, 21,481.

RÉVAI, râ'voi, Nicholas (1750-1807). An Hungarian poet and philologist, born at Szent Miklós (Torontál). He entered the Piarist Order when he was seventeen, taught drawing, philosophy, poetics, and rhetoric in the schools of the Order, and in 1802, after several years devoted entirely to literature, was appointed professor of Hungarian philology in the University of Pesth. He had begun to write poetry even before joining the Piarists, and in 1778 and 1787 published volumes of elegies, and versions from the Latin elegiasts, the Alexandrine poets, the Anacreontics, and a part of the *Iliad*. But his chief title to remembrance lies in his work in the realm of comparative grammar, his discovery that Lapp, Finnish, Esthonian, and Ostiak are nearly akin to Hungarian, and his researches in Magyar etymology, as contained in *Antiquitates Literaturæ Hungaricæ* (1803) and *Grammatica Hungarica* (1803-06).

REVAL, rĕv'âl (Russ. *Revel*). An important Baltic seaport of Russia, and capital of the Government of Esthonia, situated on the Bay of Reval, an inlet of the Gulf of Finland, about 230 miles west-southwest of Saint Petersburg (Map: Russia, B 3). The town consists of two parts, the upper town or Domberg (Cathedral Hill), with the old castle, the administration buildings, and the residences of the aristocracy, and the lower town, mediæval in appearance and containing the old town hall, the House of the Schwarzhäupter (an association of merchants), dating from the time when the town was a member of the Hansa, and a guild house with a museum of Baltic antiquities. The educational institutions include three gymnasia, a Realschule, and a technical railway school.

The manufactures are machinery and beer. The harbor of Reval is one of the most spacious in Russia and freezes but seldom. The annual value of the commerce is over $30,000,000, giving Reval the third rank among the Baltic ports of Russia. The principal exports are spirits, grain, flax, and animals; the chief imports, cotton, coal, and petroleum. Reval is the seat of an admiralty and of the administration of the Baltic lighthouses. The sea baths in the vicinity are well patronized. Population, in 1897, 64,600, about one-half Esthonian, and over one-fourth German. The foundation of Reval is ascribed to the Danish King Waldemar II., who built there a castle in 1219. The town joined the Hanseatic League in 1285 and soon attained considerable commercial importance. In 1346 it passed from the overlordship of the Danes to that of the Teutonic Knights. Sweden acquired it in 1561, and Peter the Great annexed it to Russia in 1710. Consult: Amelung, *Revaler Altertümer* (Reval, 1884); Rottbeck and Neumann, *Geschichte und Kunstdenkmäler der Stadt Reval* (Reval, 1896).

RÊVE, râv, Le (Fr., The Dream). One of the Rougon-Macquart series of novels by Emile Zola (1888). The story is in strong contrast with others of the series, the life of cathedral establishments forming the background of an idyllic tale of mysticism and human love.

REVEILLE, re-vāl'yâ, *or* (more usually in United States military service) rĕv'â-lē' (OF. *reveil*, Fr. *réveil*, awakening, from OF. *resveiller*, to awake again, from *re-*, again + *esveiller*, to awake, from Lat. *ex*, out + *vigilare*, to awake, from *vigil*, wakeful, from *vigere*, to be lively;

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ultimately connected with Eng. *wake*). A military trumpet, bugle, or drum call sounded at break of day, or such time afterwards as may be ordered, to rouse the men from sleep. Officially, it is the commencement of the day's routine. The military day is from reveille to retreat (q.v.); and the night from retreat to reveille. See BUGLE AND TRUMPET CALLS.

REVELATION (Lat. *revelatio*, from *revelare*, to reveal, unveil, from *re-*, back again, anew + *velare*, to veil, from *velum*, veil, cloth, sail, from *vehere*, to carry along). In theology, a term used in both a general and a specific sense. In its broadest signification it expresses the unveiling or manifestation of the Divine to the human. In the narrower sense it is applied to one form of this manifestation, viz. the written word of God.

Using the term in the first or general sense, God manifests Himself in nature, in history, in the moral government of the world, in reason, and in the old ethnic religions and certain of the pagan philosophers. It seems impossible to believe in man and in a personal God without believing in a Revelation. The aspirations of the soul demand it. Man himself, as reflecting the Divine image, warrants it. Nature is the speaking and acting of God. It is Divine language in cipher. The universe is a manifestation of God's glory, a disclosure of His power. Specific revelation does not contradict these indications of Divine truth in nature. It gives them articulate expression. *History* and revelation are inseparable. The march of events and the development of ideas are but parts of a moving panorama of Divine creation and guidance. History is a chapter in the book of man's evolution. Behind the veil of external contingency there are the moral order of the life of nations, the rise and fall of dynasties, the progressive history of the human race, the development of man's religious consciousness in thought and in civilization. *Reason* and revelation are not antagonistic. Reason grasps and discerns and even defines the supersensuous. It is part of the Divine image in man, and so is naturally predisposed to the reception of the revealed. Many truths sometimes held not to be discoverable by reason are perfectly agreeable to it when discovered. The *ethnic religions* were clearly media of Divine revelation. They were partial disclosures of God to man—a feature in His gradual unveiling of Himself. They were preparatory to Christianity. *Pagan philosophy*, in the persons of some of its brightest lights, was a forerunner of the written word. Men like Socrates, Plato, and Aristotle among the Greeks, and Cicero, Epictetus, and Marcus Aurelius among the Romans, had wonderful glimpses of truth, and formulated admirable moral codes. They have been described as Christians without knowledge of the Christ. In fact, natural and revealed religion are now widely viewed as parts of a great whole, and not as distinct and separate manifestations of the Divine. Much of the teaching of revelation, technically so called, consists in the unveiling to us of nature and of life. Revelation does not merely superadd to the achievements of human knowledge. It penetrates to the moral and spiritual meaning of the world in which we live.

The advocates of a special revelation maintain that, despite all this, the fact remains that the disclosure of the Divine in revelation generally was but partial, and therefore preparatory to a specific revelation. Man in his intellectuality was painfully sensible of the soul-sickness of the world, but he had no cure. To break the power of sin and quicken the higher and spiritual life he needed a revelation of fatherly love. The deepest discoveries and loftiest achievements of the human intellect needed to be supplemented by a special revelation. "The world by wisdom knew not God." The specific revelation was given in the written word. It may be divided into three epochs, the primitive revelation or protevangelium, the covenant revelation to Israel, and the revelation in the appearance of Jesus Christ. The Incarnation (q.v.) is held to be the culmination of every Divine manifestation, the central point of all history, sacred and profane (Heb. i. 1 and 2). The Old Testament represented a gradual process of education, as evinced, for instance, in the voice in the garden, the theophanies, the burning bush, and dreams and visions. God gave to men as they were able to receive. But the message became more and more explicit as the history of the ancient people was developed, until it culminated in Jesus Christ, in whom men saw "God manifest in the flesh" (John i. 18). The Old Testament is meaningless without the New. The Bible message is incomplete without the story of the Christ.

In discussing the specific revelation of the Scriptures it should be borne in mind that revelation and inspiration are not synonymous terms. Scientific theology distinguishes between them as to both authorship and function. The author of revelation, in the Old Testament and the New, is held to be the Divine Word, the *Logos* (John i. 1 et seq.). The author of inspiration is the Holy Spirit (II. Peter i. 21). *Revelation* has been limited to the direct communication from God to man of (1) such knowledge as man could not attain to in and of himself, and (2) information which, though attainable in the ordinary way, was not, in point of fact, known to the person who received the revelation. *Inspiration* is explained as the actuating energy of the Divine Spirit, under whose guidance the human agents chosen by God have officially proclaimed His will either by (1) word of mouth, or (2) the committal to writing of the several parts of the Bible.

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REVELATION OF SAINT JOHN, THE. The name given in the English Bible to the last book in the New Testament. In early lists and manuscripts it is called the Apocalypse of John, the current English title, Revelation, being from the Latin equivalent of the Greek word *Apocalypsis*, the first word of the book.

I. THE NATURE OF APOCALYPTICAL LITERATURE. The Book of Revelation belongs to a distinct class of literature, which has been called,

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after the title of this book, apocalyptic. (See APOCALYPTIC LITERATURE.) Only in the light of this classification can the book be understood. The purpose of an apocalypse is usually to explain the present dominion of evil in the world, and to encourage faith by foretelling the approaching end of evil and the fulfillment of the prophetic hopes. The explanation of evil is usually found in the angel-world, and the consummation hoped for is a new world-age, which will come by a miraculous deed of God. Man can do nothing but wait for it with patient faith, and the seer's art consists chiefly in discovering the time and manner of its coming. This he does by such a fitting together of ancient prophecies and apocalyptical images with the events of his own time as shall give assurance that the longed for end is at hand.

Turning to the Book of Revelation, there can be no doubt that it is an apocalypse in the sense just defined, and the presumption that it is to be interpreted as such is strong. Like Daniel, it was written in a time of religious persecution at the hands of the ruling kingdom of the world, and its aim was to encourage the faithful to resist the allurements and endure the violence of the world power in view of the speedy coming of judgment and deliverance. Like Daniel, it has the course and end of world-history in view, and not principally the destiny of the individual soul. Other apocalyptical features of the Book of Revelation are its constant use of the vision form with angelic interpreters; its abundance of highly wrought and fantastic imagery, derived in large part from the Old Testament and from apocalyptical traditions, though freely combined and applied to new conditions; its explanation of the present dominance of evil as due to angel powers, whose malign rule is embodied in the Roman Empire; and its general scheme of the future, which with slight exceptions runs parallel to that of Jewish apocalypses. The mark that distinguishes the book as Christian is the identification of the Messiah with Jesus. We do not find, however, that this involves differences great enough to justify us in separating the book from the class and applying to it different methods of interpretation. It is, then, to be assumed that the predictions of the book concern the immediate and not the distant future, as indeed the writer explicitly affirms (i. 1, 3, xxii. 10-12). There is every probability that the earthly representative and agent of the power of evil is the Roman Empire. We shall expect to find visions or fragments from earlier writings or traditions, and to be able to distinguish between their earlier setting and application and the meaning our author gives them. Furthermore, we shall expect to find the value of the book to lie not in disclosures of the course of Church history down to the present, nor in predictions of still future events, but, historically, in its fitness to meet a great crisis in the life of the early Church, and permanently in its underlying faith in God and the certain victory of His cause.

II. CONTENTS AND PLAN. After the opening admonitions, in the form of letters, to resistance and endurance, the book sets forth the approaching judgments which will lead up to the destruction of Rome and of the satanic beings that inspire and sustain it, and to the final blessedness of the faithful. The progress of the successive visions is not, however, simply chronological, for we seem to have reached the final judgment and consummation already in chs. vi.-vii. The movement is rather toward greater concreteness and detail, and the writer is interested in accumulating a variety of figurative and prophetic materials for the expression in stirring and impressive ways of his one message that the day of God's coming to bring evil to an end and good to its rights, and its glory, is close at hand. The first suggestion of a plan is found in the successive sevens, the seals, the trumpets, and the vials, but these do not include various important sections of the book. The contents of the seventh seal seems to be set forth in the new series of seven angels with trumpets (viii. 1-5), and the seventh trumpet (xi. 15-19) is followed, but not at once, by the seven vials of God's wrath (xv.-xvi.). But chs. vii., x.-xi. 14, xii.-xiv., xvii.-xxii. have no proper place in this scheme, and justice is not done to the new beginning in ch. x. It is therefore better to divide the book somewhat as follows: Introduction (i. 1-8) I. The Seven Letters (i. 9-iii. 22). II. Preliminary Judgments (iv.-ix.). (1) The actors: God (iv.); Christ (v.); Destructive Powers (vi.); (2) Promises (vii.); (3) Judgments (viii.-ix.). III. Final Judgments (x.-xx.). The Prophet's new commission (x.); Promises (xi. 1-14); Summary or Prelude (xi. 15-19); the Actors: Satan (xii.) and the Roman Empire and emperor-worship (xiii.); Summary promises and warnings (xiv.); Judgments culminating against Rome and its Satanic upholders (xv.-xx.). IV. The Consummation (xxi.-xxii. 5). Conclusion (xxii. 6-21). There are departures from any strict order, which are probably due in part to the use of unrelated sources, and in part to the author's practical aim, which leads him by anticipation to introduce encouraging voices and visions here and there before the end.

III. THE INTERPRETATION. The curious history of the interpretation of this book cannot here be reviewed. It has been supposed to have been written against Mohammed and the Turks; against the Pope and the Roman Catholic Church; against Luther and the Reformation; against Napoleon, etc. Many still hold that the book predicts the whole course of Church history past and to come. The form in which this so-called *Church historical* or *continuously historical* interpretation has still some advocates among scholars (Auberlen, W. Milligan, Benson) is that according to which the book contains in its symbols, not the definite events, but the conflicting powers or principles, good and evil, of Christian history. Almost all scholars, however, seek for the meaning of the book in the conditions of the writer's own time.

The Roman Empire is recognized as the persecuting and godless power, the agent of Satan, whom the book assails and whose fall it announces. Isolated scholars of far older times knew this, but it was especially the work of Lücke, Bleek, and Ewald that established it. With this is commonly connected the view that Nero was the wounded head (xiii. 3), the name signified by 666 (xiii. 18), and the one whose return from Hades and attack upon Rome in alliance with the Parthians is predicted in chapter xvii. The number 666 may, however, stand, as Clemen has recently argued, for *ἡ λατίνη βασιλεία*, the Latin Kingdom.

In different parts of the book different periods

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and different types of religious and Christian thought appear to be indicated. These facts, together with the breaks in the plan of the book already referred to and the composite character of some Jewish apocalypses, have led to the effort to solve the remaining obscurities by literary analysis, and the theory of various dates and authors. Weizsäcker suggested in 1882 that the writer incorporated some older oracles, Jewish or Christian, such as vii. 1-8, vii. 9-17, xi. 1-13, xii., xiii., xvii. Vischer, on the other hand, proposed the view that the book is a Jewish apocalypse (iv. 1-xxii. 5, omitting obvious Christian amendments), set in a framework (i.-iii., xxii. 6-21) and slightly revised by a Christian hand. This theory came out in 1886 with Harnack's indorsement and was accepted by several German critics. More elaborate analyses followed. Two Jewish apocalypses were found in the book by Weyland, and Spitta (1889) made the original book a Christian apocalypse by John Mark (A.D. 60), to which a later Christian added two Jewish apocalypses of the times of Caligula and Pompey. Against this method there has been a reaction in favor of the simpler view of Weizsäcker. The unity of the book is maintained, but the writer is believed to have made use of materials already shaped by earlier hands, and in part Jewish in origin. The Jewish character of vii. 1-8 and of xi. 1-13, with its date before A.D. 70—Jewish oracles applied in a figurative sense to Christians as the true Israel—and some of the peculiarities of xii., xiii., xvii., and other passages, may thus be explained in a way consistent with the ascription of the book to a Christian writer of Domitian's reign.

The next problem naturally is concerned with the first meaning of these incorporated materials. The most important study in this direction is that of Gunkel in reference to chapter xii. (1895). His theory is that the dragon who seeks to kill the child and persecutes the mother is ultimately derived from a Babylonian account of the birth of Marduk, the sun-god, destined to destroy the chaos-dragon and to create the world. Many who have not accepted Gunkel's reconstruction of an otherwise unknown part of the Babylonian myth have approved in general his emphasis on tradition as a great factor in the production of an apocalypse, and many have assented in particular to his theory that a sun-myth underlies chapter xii., whether Babylonian or Greek (Dieterich) or Egyptian (Bousset) in origin. Wellhausen has objected to the method and declared that the writer's own meaning is all we need to inquire after, and that he has shaped his figures to represent current events to a much greater degree than Gunkel allows. Bousset, one of the most important recent writers on the subject, adheres in general to Weizsäcker's idea of the composition of the book and to Gunkel's view of the significance of tradition. He put forth the hypothesis that an apocalypse of Antichrist, of Jewish origin, was current in New Testament times and on into the Middle Ages, that it was not dependent on Revelation, but that several of the fragmentary (Jewish) traditions which Revelation incorporates were derived from it (vii. 1-8, xi. 1-13, xiii. 11-17, xiv. 14-20).

Over against the fixity of apocalyptical tradition, rightly emphasized by Gunkel and Bousset, it is necessary to recognize the fact that the writer of Revelation used Old Testament material with much freedom, and in the spirit of a poet, rather than in that of a hide-bound scribe. This is illustrated by such passages as i. 12-20, iv., xviii., xxi.-xxii. 5. The author writes as one whose mind is filled with Old Testament prophetic language; one who is almost limited to it for the expression of his thoughts, yet uses it freely and puts into it the emotions of his own soul. That his emotions were intense is a fact that must be seriously reckoned with in studying his book, whatever one may think about the question of actual ecstasy.

IV. Historical Occasion, Purpose, and Date. The Seven Letters (chapters i.-iii.) are the most original part of the book and contain the most specific references to concrete conditions. Though addressed to actual churches whose conditions the writer knows, they are evidently meant, taken together, to give the message of the spirit of Christ to all His churches. The seven cities are named in geographical order, moving from Ephesus north, east, and south. The worship of the Emperor had been enforced in this region for a long time. Pergamum had a temple to Augustus in B.C. 29 and remained the centre of the cult in Asia (cf. Rev. ii. 13). The Book of Revelation was written chiefly to encourage Christians to resist this worship at whatever cost and to warn those who were falling away under its pressure and the enticements of the heathen thought and life that went with it. This cult is the second beast of chapter xiii., and all who take part in it are threatened with the impending fate of Rome itself, while those who resist it even to death will receive a glorious reward. Some persecutions of Christians had already been endured (ii. 3, 13, iii. 8), but far more severe trials were at hand (ii. 10, iii. 10) for which the book would prepare the way. The glory and reward of martyrdom are its theme. An official persecution of Christianity such as is here contemplated points to a time not earlier than Domitian. The relaxation of earlier zeal, the loss of love, the adoption of heathen ways of living, which the letters condemn, indicate the same period, as does the fact that Paul's position as founder of the church at Ephesus appears to be wholly a thing of the past. It is true that xi. 1-13 dates from before A.D. 70, but it is no less certain that it was originally a Jewish oracle. Its application in a figurative sense to the safety of the true worshipers of God, that is Christians, in the approaching crisis shows that the literal siege and fall of Jerusalem had long ago proved the oracle to be in its literal sense—which was indeed contrary to the word of Jesus—untrue. In xvii. 10, Vespasian seems indicated, but verse 11 is probably meant to carry us over into Domitian's reign. If the Nero myth is referred to in chapter xvii., this also, in this form, belongs to the close of the century. We may therefore conclude that the book was written, as Irenæus says, "near the end of the reign of Domitian," that is about A.D. 93-96.

V. The Christianity of the Book. The relation of the book to Paulinism is an unsolved problem. The stress it lays upon the transcendence of God, and upon the kingly and judicial functions of Christ, its view of salvation as a reward for overcoming the world and keeping the commands of God, are Judaistic aspects of the religion of the book. Its attitude toward Rome, also, is not that of Christ (Mark xii. 17) and

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of Paul (Rom. xiii. 1-7, cf. I Pet. ii. 13-17). Yet an anti-Pauline tendency need not be inferred. Circumstances had changed, and Rome had become the power of lawlessness, instead of the one who restrained that power (II Thess. ii. 7), so that Antichrist would inevitably take on a Roman in place of a Jewish form. Furthermore, over against the Jewish-Christian traits of the book we find a Christology not unrelated to Paul's (cf. i. 5, iii. 14, with Col. i. 18, and Rev. v. 9 sqq. with Phil. ii. 5 sqq.), an eschatology at many points in striking agreement with his, and a universality which at least is totally different from the exclusiveness of Paul's Judaistic opponents (vii. 9 sqq.). We cannot therefore with Baur regard Revelation as a simple product of the Jewish Christianity which opposed Paul. It is probably best to say that the book represents a late development of primitive Christianity, not much influenced either way by Paul.

VI. CANONICITY AND AUTHORSHIP. The place of Revelation in the canon has been much disputed. It was accepted in the Western Church after Hippolytus wrote in its defense against Caius, a Presbyter of Rome (c.215). For a long time the Eastern Church refused to recognize the book as canonical. Eusebius records and sympathizes with the objections of its critics. It was not in the original Syriac New Testament. The pressure of the Western Church finally secured its place in the canon. In the West only Jerome shows some sympathy with Eastern doubts. Its place in the canon was again somewhat insecure at the beginning of the Reformation—Luther in the first edition of his New Testament expressed a strong aversion to it, because of its obscurity, and especially because he did not find in it the Pauline gospel. Later he expressed a more favorable judgment. Zwingli did not accept it as canonical. Calvin at least did not comment upon it.

The writer calls himself John (i. 1, 4, 9; xxii. 8), and says that he saw his visions on the island of Patmos (q.v.), where he was, it would seem, in banishment. Justin Martyr is the first to identify this John with the Apostle, and from Irenæus and Tertullian onward this view was almost unquestioned. Yet Dionysius of Alexandria (c. 255) argued on the basis of a comparison with the fourth Gospel that the author of Revelation was another John; and Eusebius suggested the Presbyter John, of whom Papias speaks. The earliest opponents of the canonicity of the book, the Alogi, ascribed it to the Gnostic Cerinthus, an idea adopted by Caius. The author himself does not say that he is an Apostle (see on the contrary, xxi. 14; xviii. 20), and nowhere reveals any personal knowledge of the earthly life of Jesus. It cannot quite be said that he assumes a position of personal or official authority over the seven churches. He is their brother and fellow in trial (i. 9), but the authority that speaks through him is Christ. He claims only to be a true prophet, truly to convey the message of Christ. For his book he makes great claims, but not for himself. Of the three possibilities: that it is by the Apostle; that it is a pseudonymous writing, in the Apostle's name; and that it is by another John—the second can with some confidence be rejected. For though pseudonymity characterizes all Jewish apocalypses, we find here none of the familiar signs of it, no references to known events in the life of John such as we should expect. If the Apostle were the recognized head of the churches of Asia, centring in Ephesus, during the last quarter of the first century, the expression "John to the seven churches" (i. 4) would suggest him. If that place was occupied by John the Presbyter, he would be the one indicated. The most serious difficulty in the way of accepting the Apostle's authorship is the radical difference in style and in conception that separates the Apocalypse from the Gospel. Though minor points of likeness exist, the difference is so great that it seems almost impossible to ascribe them to one mind. The difficulty is greater now that it is no longer probable that they can be separated widely in date by putting Revelation before A.D. 70. The question of authorship must therefore remain open, but this question does not affect our view of the value of the book and the way in which it is to be understood.

BIBLIOGRAPHY. The Church-historical view can be read best in Milligan, *Commentary on the Apocalypse*, Baird Lectures (London, 1886); id., *Discussions on the Apocalypse* (ib., 1893); id., *The Book of Revelation*, Expositor's Bible (New York, 1899); and in Benson, *The Apocalypse* (London, 1900); the older critical view (contemporary-historical), in the commentaries of Lücke (2d ed., Bonn, 1848-52); Bleek (Berlin, 1862); and Ewald (Göttingen, 1862). Consult also the commentary of Alford (London, 1867). The best recent commentaries are those of Bousset (Göttingen, 1896) and Holtzmann (Freiburg, 2d ed., 1893), and in English, Simcox, Cambridge Bible (Cambridge, 1898), and Scott, Century Bible (Edinburgh, 1902). Consult further the introductions to the New Testament by Weiss (London (1887); Holtzmann (Freiburg, 3d ed., 1892); Zahn (Erlangen, 1897-99); Jülicher (Tübingen, 3d ed., 1901), and Moffatt, *Historical New Testament* (New York, 1901); the New Testament theologies by Weiss (Edinburgh, 1885); Holtzmann (Freiburg, 1896); Stevens (New York, 1899); Wernle, *Beginnings of Christianity* (London, 1903); and Histories of the Apostolic Age by Weizsäcker (London, 1894), McGiffert (New York, 1897), and Bartlet (London, 1900). Consult further Gunkel, *Schöpfung und Chaos in Urzeit und Endzeit* (Göttingen, 1895); Bousset, *The Antichrist Legend* (trans. by Keane, London, 1896); articles by Bousset, "Apocalypse," in *Encyclopædia Biblica* (London, 1899); Porter, "Revelation," in the Hastings *Dictionary of the Bible* (New York, 1898).

REVENUE, PUBLIC. See FINANCE; TAXATION.

REVENUE CUTTER SERVICE, UNITED STATES. A military service, organized by act of Congress in 1790, for the enforcement of navigation and customs laws. It was the first armed maritime force of the Government, having been constituted about eight years before the United States Navy. There being no naval establishment at that time, the service, as a matter of convenience, was attached to the Treasury Department, then presided over by Alexander Hamilton, where it has since remained. Its first fleet consisted of 10 small, single-masted, light-draught sail-

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ing vessels, manned with 10 masters, 30 mates, 40 mariners, and 20 boys. By degrees, and as occasion arose, the service was augmented in strength and armament, and on July 1, 1799, Congress authorized the President to "cause the revenue cutters to be employed to defend the sea-coast and to repel hostility to vessels and commerce within their jurisdiction." The rapid growth of foreign trade, and a shipping interest that was constantly developing at home, created the necessity for more efficient means of protection, and swifter cruisers, better armed, manned and equipped, were gradually added to the force. The duties of these vessels were extended to the suppression of piracy that had become common on account of the many adventurers attracted to American waters. A distinctive revenue ensign and pennant were provided by law. (See Colored Plate in article FLAG.) Beginning in 1843, steamers were introduced, and they have entirely superseded the old type of sailing cutters.

Revenue cutters have participated in all the wars of the United States except the Algerine war, and have been prompt to respond to any emergency. In 1797, when France assumed a belligerent attitude, and during the troublous times that followed, the cutters aided in maintaining the dignity and position of the Government. Seven of them were employed in the waters of the West Indies. The Embargo Act of 1807, intended to countervail Napoleon's decrees, put the service into special requisition in guarding the seaboard and preventing the departure of unauthorized merchant ships. In the War of 1812 its force was actively engaged in patrolling the coast and repelling foreign invasion. During the nullification troubles of 1832-33 several revenue vessels were stationed off Charleston ready to enforce the execution of the tariff laws. At the time of the Seminole War, in 1836, they transported troops and munitions, and afforded protection to settlers along the coast. In the war with Mexico eight vessels shared in the naval attacks on Alvarado and Tabasco and coöperated with the naval squadron. In 1858 the steam cutter *Harriet Lane* took part in the naval expedition to Paraguay, and was considered one of the most efficient ships of the fleet. During the Civil War the cutters were busily engaged conveying dispatches, pursuing blockade-runners, doing guard and reconnaissance duty, and joining in attacks on the enemy's forts and batteries. Throughout the war with Spain 20 vessels of the service, carrying 71 guns, 131 officers, and 725 men, were employed with the army and navy, while 3, just constructed, with 25 officers and 210 men, were under orders to go to the front when the war closed. Eight cutters were in the North Atlantic squadron on the Cuban blockade, 4 coöperated with the navy on the Pacific coast, while one was in the Battle of Manila Bay.

In 1903 there were in the service 44 vessels, 17 of them harbor and anchorage boats, steam launches, etc., 1 a practice bark, and the remaining 26 steamers ranging from 152 to 869 tons burden. Those built of steel in recent years are admirable models of marine design and architecture and are among the fastest of their class afloat. Nearly all have been constructed under the immediate supervision of officers of the corps and devised with special reference to the general needs of the service. They are usually armed with from 2 to 9 improved rapid-fire guns, and are provided with necessary small arms for the use of the crews. In time of war their equipment may be readily augmented. The vessels are kept prepared, as far as possible, for prolonged voyages and the performance of any duty that may be legally assigned them. In this connection it may be stated that about all the early authentic information concerning the natural features of Alaska, its climate, the characteristics of the natives, and the resources of that country, were obtained by explorations made by officers of the revenue cutter service. Several vessels make cruises each year into the Bering Sea and Arctic Ocean for the protection of the fisheries and Government interests.

The active list of the service comprised, in 1903, 37 captains, 37 first lieutenants, 37 second lieutenants, 37 third lieutenants and cadets, 1 captain of engineers, 35 chief engineers, 17 first assistant engineers, 18 second assistant engineers, and 1 constructor, and in addition about 1000 petty officers and seamen. The officers of the engineer corps rank with line officers of corresponding grades, and the constructor has the rank of first lieutenant. All are commissioned by the President, by and with the advice and consent of the Senate, and, under the law, rank is held as follows: Captains with majors in the army and lieutenant-commanders in the navy; first lieutenants with captains in the army and lieutenants in the navy; second lieutenants with first lieutenants in the army and lieutenants (junior grade) in the navy; third lieutenants with second lieutenants in the army and ensigns in the navy. When revenue cutters serve in coöperation with the navy, pursuant to law, their officers hold rank with and next after naval officers of the grades named. The commissioned officers of the service receive the same pay and allowances as officers of corresponding rank in the army, and are retired for physical disability or on reaching the age of 64 years. Promotions are made, in the order of seniority, to fill vacancies which may occur in the various grades, after the candidates have qualified by a professional examination.

In 1876 Congress enacted a measure permitting the Secretary of the Treasury to appoint cadets to fill vacancies occurring in the grade of third lieutenant. The object was to provide means for educating young men for deck officers. Under the operation of this system nearly two-thirds of the active list of the line in 1903 were composed of cadet graduates. Some 10 additional appointments have been made from graduates of the Naval Academy. Before the cadet system was organized candidates from the merchant marine and volunteer navy were admitted directly to the grade of third lieutenant. An applicant for a cadetship must be not less than 18 nor more than 25 years of age, of vigorous constitution, physically sound and well formed, not less than 5 feet 3 inches in height, of good moral character, and unmarried. He is required to pass a satisfactory entrance examination in spelling, geography, general history and Constitution of the United States, grammar, composition and rhetoric, arithmetic, algebra, geometry, trigonometry, physics, English literature, one modern language (either French, German, or Spanish), and general information. The examination, which is open to all qualified

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persons, is held annually under the direction of the Civil Service Commission. From those passing highest, provided they reach the required standard, a class is formed which is ordered to report for instruction on the practice ship *Chase*. The term on the practice ship covers a period of three years and comprehends a strict course of discipline and instruction in all matters pertaining to the professional requirements of an officer. A cadet receives $500 per annum and one ration per day, and must provide himself with the prescribed uniforms. At the expiration of his probationary term of three years, if his deportment and progress have been satisfactory, he is rewarded with a commission as third lieutenant. Original appointments in the engineer corps are made from civil life upon thorough examinations.

The work of the Revenue Cutter Service, as defined by law, consists in the enforcement of about every statute bearing upon the maritime interests of the nation. Its duties embrace the protection of the customs revenue; the enforcement of the laws against smuggling, those pertaining to national quarantine, the neutrality laws, the navigation laws, including vessels' documents, and all requirements in regard to the rules for preventing collisions, officers' papers, steamboat inspection, and passenger service; the laws in suppression of piracy, robbery, and mutiny on the high seas; those for the protection of the seal fisheries and sea-otter hunting grounds in Alaska, and for the prevention of illegal traffic in firearms, ammunition, etc., in that territory; the laws for the protection of wrecked property and the timber reserves of the United States; the laws for the suppression of the slave trade; those that require necessary life-saving appliances to be kept on board merchant vessels; the laws in regard to the anchorage of vessels in the ports of New York and Chicago, in the Saint Marys River, Michigan, etc., and the regulations to insure the safety of observers of and participants in regattas on navigable waters. During the dangerous and inclement season, from December 1 to April 1 of each year, revenue cutters are, by direction of the President, required to cruise actively along the coast to afford aid to vessels in distress. Those detailed for such duty are provided with special supplies, including extra provisions for the shipwrecked, and are instructed to extend to all requiring relief such assistance as may be adapted to their condition and necessities. The cutters on the Great Lakes are, during the period of open navigation, charged with similar important work. An important function of revenue cutter officers is their connection with the Life-Saving Service (q.v.). They are detailed to do the inspection work of the latter and to drill the surfmen in the use of life-saving apparatus, and to see that the equipments of the stations are kept in efficient condition. Several officers are also assigned to superintend repairs and the construction of new stations. Besides the fixed duties of the service there are numerous others which it is called upon to perform from time to time, such as aiding the Public Health and Marine Hospital Service, the Lighthouse Establishment, the Coast Survey, the Fish Commissioner, the ocean telegraph lines, etc. Each vessel has assigned to her a certain district, within which she carries out her specified duties. The districts on the Atlantic and Pacific seaboards and the Great Lakes are contiguous and therefore cover the entire coast of the United States.

REVERBERATORY FURNACE. See IRON AND STEEL; LEAD.

REVERE, rē-vēr′. A town, including three villages, in Suffolk County, Mass., five miles north by east of Boston; on the Boston and Maine and the Boston, Revere Beach and Lynn railroads (Map: Massachusetts, E 3). It is finely situated on the Atlantic coast, and is an attractive residential place and a summer resort. Revere Beach has a bath-house built and maintained by the State, and is one of the most popular bathing resorts on the Massachusetts coast. It has also a splendid boulevard. There are a handsome town hall and a public library with 7000 volumes. Revere was settled in 1626 and, under the name of Rumney Marsh, formed a part of Boston until 1738. Incorporated as Chelsea in 1739, it was set off and reincorporated as North Chelsea in 1846, and received its present name in 1871. Population, in 1890, 5668; in 1900, 10,395.

REVERE, rā′vâ-râ, GIUSEPPE (1812-89). An Italian poet, born at Triest. He wrote for *La Concordia*, a liberal journal of Turin; took part in the events of 1848; and afterwards lived in Turin, Genoa, and Rome. He began his career as a dramatist with a series of historical plays, in the form made popular by Niccolini. He also wrote the historical works, *La cacciata degli Spagnuoli da Siena* (1847); the poetical works, *Sdegno e affetto* (1845), *Nuovi sonetti* (1846), *Persone ed ombre* (1862), *Osiride* (1879); and two volumes of sketches, *Bozzetti alpini* (1857) and *Marine e paesi* (1858).

REVERE′, PAUL (1735-1818). An American patriot, born in Boston, Mass. He learned from his father the trade of a goldsmith and soon became skillful as an engraver on silverware. In 1756 he served as a lieutenant in the Crown Point expedition, and, returning to Boston, established himself as a goldsmith and a copper-plate engraver. He was a member of the grand jury which in 1774 refused to serve on account of the act of Parliament making judges independent of the legislature as regards salary. He engraved the plates and printed the paper money ordered in 1775 by the Provincial Congress, and in the same year established a powder mill in Boston. He early took an active interest in the disputes with the English Ministry, participating in the "Tea Party" (1773) and carrying the news of it to New York and Philadelphia, and in 1774 became a member of a society organized to watch the British in Boston. On April 18-19, 1775, at the request of Joseph Warren, he made his memorable midnight ride to Lexington to warn Hancock and Samuel Adams of the approach of English troops, arousing the people on the way. Then, passing on toward Concord with William Dawes and Dr. Samuel Prescott to warn the people there, he was captured by a party of British soldiers and was brought back to Lexington, where he was released on the next day. This ride has been made the theme of a celebrated poem, *The Midnight Ride of Paul Revere*, by Longfellow. Subsequently becoming lieutenant-colonel of State artillery, Revere accompanied the unsuccessful Penobscot expedition in 1779.

REVERIE, or **REVERY** (Fr. *rêverie*, OF. *resverie*, from *resver*, *rêver*, *rever*, to rave, from

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Lat. *rabies*, rage, from *rabere*, to rage). A word borrowed from the French, and somewhat loosely used to signify a state of mind obtaining during waking life and characterized by neglect of present surroundings, meditativeness or abstraction. True reverie, like the dream of sleep, is marked by a condition of discursive, passive attention. There is, to be sure, abstraction, forgetfulness of one's environment, but the trend of consciousness is not toward any definite goal. Like the dream, too, the reverie is apt to be fleeting and easily forgotten. Its fancifulness and fleetingness is but another evidence of the lack of control by active attention. Consult: Titchener, *Outline of Psychology* (New York, 1899); James, *Text-book of Psychology* (New York, 1892); Carpenter, *Mental Physiology* (London, 1888). See ASSOCIATION OF IDEAS; ATTENTION; DREAMING; HYPNOTISM.

REVERSION (Lat. *reversio*, from *revertere*, to turn back, from *re-*, back again, anew + *vertere*, to turn; connected with Skt. *vart*, OChurch Slav. *vrŭtĕti*, *vratiti*, to turn, Goth. *waírþan*, AS. *weorþan*, OHG. *werdan*, Ger. *werden*, to become). A form of heredity (q.v.). Cases occur where an individual inherits not its parents' physical or mental characteristics, but those of its grandparents, or more remote ancestors. This happens in cultivated plants and domestic animals artificially bred from wild forms. If such forms are neglected or return to free nature, i.e. run wild, they tend to 'revert,' 'throw back,' i.e. to transmit the characteristics of the original wild species or variety. Darwin remarks that reversion may be divided into two classes: (1) Those occurring in a variety or race which has not been crossed, but has lost by variation some character that it formerly possessed, and which afterwards reappears; (2) all cases in which an individual with some distinguishable character, a race, or species, has at some former time been crossed, and a character derived from this cross, after having disappeared during one or several generations, suddenly reappears. He gives extensive examples in illustration, and concludes that a tendency to atavism is "an integral part of the general law of inheritance." In breeding zebra-hybrids by crossing mares of various sizes with a male zebra, the hybrids, says Ewart, showed a curious blending of characters, derived apparently partly from their actual and partly from their remote ancestors. As the result of Ewart's experiments some of the hybrids in make and disposition strongly suggest their zebra sire, others their respective dams, but even the most zebra-like in form are utterly unlike their sire in their markings, probably taking after an ancestor thousands of generations removed. Consult: Darwin, *Variation of Animals and Plants Under Domestication* (London, 1888); Ewart, *The Penycuik Experiments* (London, 1899). Compare ATAVISM.

REVERSION. The residue of an estate or interest remaining in a grantor of real property who has conveyed away one or more estates in it, amounting to less than a fee simple in quality and duration. A reversion is said to arise by operation of law, that is, without special act of the parties to a conveyance, and in this respect it differs from a remainder, which must be created by express words in a conveyance. See REMAINDER. Consult the authorities referred to under REAL PROPERTY.

REVETMENT (Fr. *revêtement*, from *revêtir*, OF. *revestir*, to line, from *re-*, again + Fr. *vêtir*, OF. *vestir*, to clothe, from Lat. *vestire*, to clothe, from *vestis*, garment). An important device in both permanent and field military fortifications. In the former, it is usually a retaining wall of masonry, built for the purpose of holding back or strengthening the earth of which the works are composed. Revetments are ordinarily used for the escarp (q.v.) and counterscarp (q.v.) of the ditch (q.v.), the more important being the escarp, which has to hold back the great mass of earth represented by the rampart, the parapet, and the banquette. It is usually of solid brickwork or stone, about 5 feet thick at the top, and sloping outward as it descends (on the ditch side only) about 1 in 6. Additional strength is obtained by reinforcing the revetment wall by massive buttresses at intervals of 15 feet, called *counterforts*, and these again are sometimes connected and strengthened by masonry arches outside the revetment. In field works the amount of resistance offered by a redoubt or similar fortification to the artillery fire of an enemy will greatly depend on the character of the revetments, which may be of sods, timber, hurdles, or gabions (q.v.). See FORTIFICATION; REDOUBT; and SIEGE AND SIEGE WORKS.

REVIEW (OF., Fr. *revue*, from *revoir*, to review, from Lat. *revidere*, to see again, from *re-*, back again, anew + *videre*, to see). A military parade, followed by inspection and review, the latter usually consisting of a salute tendered to the reviewing officer as the troops 'march past.' This ceremony to-day is merely an exhibition of number, equipment, bearing, discipline, physique, and general condition, and consequently is treated almost exclusively as a compliment to a distinguished visitor, or as the finale to a field day. In the United States Army, reviews may be held by a battalion, regiment, brigade, division, or corps; but only on such occasions and for such purposes as are authorized by army regulations.

REVIEW. See PERIODICAL.

RÉVILLE, rā'vēl', ALBERT (1826—). A French Protestant clergyman and author, born at Dieppe (Seine-Inférieure). He studied at Dieppe, Geneva, and Strassburg; was for a time vicar at Nîmes, later pastor at Luneray, near Dieppe, and in 1851 became pastor of the Walloon Church at Rotterdam. In 1873 he returned to Dieppe, where he pursued philosophical studies until his appointment as professor of the history of religions in the Collège de France. He also became president of the section of religious sciences in the Ecole Pratique des Hautes Etudes. He ranked as one of the most advanced representatives of the French liberal Protestantism of his time. His publications include a translation (1849) of Whately's *Introductory Lessons on the History of Religious Worship* (London, 1849), *Essais de critique religieuse* (1860; 2d ed. 1869), *Théodore Parker, sa vie et ses œuvres* (1865), *Douze sermons* (1874), *Prolégomènes de l'histoire des religions* (1881), and the *Histoire des religions* (1883-89), his most extensive and important work.

REVILLOUT, rā'vē'yōō', EUGÈNE (1843—). A French Egyptologist, born at Besançon. He

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was educated for the Church, but preferred Oriental studies, entered the department of Egyptian antiquities at the Louvre as an assistant in 1869, aided in founding the École du Louvre in 1880, and in 1881 became professor and curator of the Egyptian collection of that museum. Revillout's great work was the publication of the *Chrestomathie démotique* (1878-80), supplementing Brugsch's discoveries in the demotic language. Besides, he specialized on Egyptian law, founded, with Brugsch and Chabas, the *Revue Egyptologique* in 1880, and published: *Papyrus coptes* (1876), *Le roman de Setna* (1880), *Corpus Papyrorum Ægypti* (1885-92), *Cours de droit égyptien* (1885), *Cours de langue démotique* (1885), *Lettres sur les monnaies égyptiennes* (1895), *Mélanges sur la métrologie, l'économie politique et l'histoire de l'ancienne Egypte* (1897), and *Précis du droit égyptien* (1899-1903).

REVISED STATUTES. The acts of the legislatures of the various States and of Congress are usually printed and bound into volumes after each session of those bodies. This is done by an authorized printer under the supervision of a State official, usually the Secretary of State, who compares the acts as thus printed with the original copies thereof, and certifies as to their accuracy. Such publications are known as the *statutes at large*, and include all acts whether general or local in character. After a large number of these volumes have been issued, covering a considerable number of sessions, it naturally follows that many of the acts found in the earlier volumes are repealed or amended by acts reported in the later ones; and that some statutes have become practically obsolete by reason of changed conditions. Under these circumstances, it is necessary to examine all the 'year books,' as such volumes are usually called, in order to determine the statute law on any given subject. In order to render the statute law more accessible, settle positively any questions as to the intention of the legislature in passing acts repealing former ones, and to cure any defects in form or substance which have become apparent in existing statutes, most of the States have at some time authorized thorough revisions of their statute law. The work is usually done by a committee of the State legislature, who arrange the existing statutes under general heads, and draft such amendments and alterations as are deemed advisable. Strictly local or special statutes are sometimes omitted in the revision. The general laws, as thus collected, arranged and amended, are reënacted and then constitute the official revised statutes, superseding all original acts. There have been several revisions of the statutes of the United States. For acts supplementary to or amendatory of the revised statutes, the Statutes at Large, published after each session, should be consulted.

REVIVAL OF LEARNING. See RENAISSANCE; HUMANISM.

REVIVALS (from *revive*, from Lat. *revivere*, to live again, from *re-*, back again, anew + *vivere*, to live), RELIGIOUS. A term widely used among Protestants since early in the eighteenth century, to denote periods of marked religious interest, when church-members are quickened to a new sense of responsibility and privilege, and others are for the first time brought openly to confess their faith. By an extension of its meaning, the term is sometimes applied to various important religious movements of the past, like that of the Day of Pentecost (Acts ii.), of the Wiclifites in England, the Hussites in Bohemia, and the Reformers of the sixteenth century. In a similar way it might be used of the religious zeal which led to the First Crusade, the work of the great monastic Orders in some periods of their history, the Oxford Movement, and so on. But it is more accurate and better to limit the application of the term 'revival' to the history of modern Protestantism, especially in Great Britain and America, where such movements have flourished with especial vigor. Yet in so doing, one should not forget that there were similar revivals of religion in Scotland as early as the end of the sixteenth century (under Wishart, Cooper, and Welsh), and again, both there and in the north of Ireland, about a generation later, when Bruce and Livingston were prominent as leaders (the Stewarton Movement).

Seasons of religious quickening occurred in the colony of Massachusetts Bay between 1704 and 1718, but in importance and influence they were far overshadowed by the work of Jonathan Edwards (q.v.) at Northampton in 1734. His preaching so deeply affected his hearers that about three hundred persons were converted. The movement spread through a large part of New England in the next two years, and formed a suitable introduction to 'The Great Awakening,' a revival which extended through almost all the colonies and influenced either directly or indirectly almost all the churches. This movement began about the same time as that of John Wesley in England. Its most active agent was George Whitefield (q.v.), a preacher of singular power and inexhaustible energy, who came from England to America in 1739, and traveled through the country, preaching in the open air to audiences of thousands, and winning a large number of converts. The Great Awakening proper occupied the years 1740-42. Several evangelists were enlisted in its service, notably the zealous but censorious Gilbert Tennent (q.v.), a Presbyterian, who had begun revivalist work in New Jersey before Whitefield's arrival. Among the most obvious results of the Awakening were the addition, between 1740 and 1760, of 150 churches to the number already established in New England and the doubling of the number of Presbyterian ministers in the middle colonies. Princeton College grew out of the movement, and the plan for a school for the education of the Indians was conceived about the same time, from which later came Dartmouth College (q.v.). The Wesleyan movement did for England what the Great Awakening did for America, but with a new and permanent ecclesiastical organization as its product.

Toward the end of the eighteenth century a fresh series of revivals began, lasting intermittently from 1797 to 1859. The beginning of this long period was called, in New England, the 'evangelical re-awakening.' The work was carried on at first by parish ministers, not by traveling evangelists, and the churches soon came to depend upon revivals for their growth and even for their life. As time went on, the work was taken up by itinerant preachers also. Among the prominent leaders were Nathan Strong, Edward Dorr Griffin, Jeremiah Hallock, Timothy

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M. Cooley, and Charles G. Finney. The early years of the nineteenth century were marked by great missionary zeal, reaching out beyond the boundaries of New England, and even to foreign lands. See MISSIONS, CHRISTIAN.

Toward the southwest, in Tennessee and Kentucky, we meet for the first time with 'camp-meetings,' great open-air assemblies, which since 1800 have played an important part in the evangelistic work of the Methodist Church. (See CAMP-MEETING.) Ministers of other denominations at first participated in this movement, special sympathy being manifested by the Presbyterians, but the extreme excitement soon alienated them from it. A considerable number of Presbyterians, however, who continued to believe in the revival theory as there illustrated, withdrew from communion with the main body, and formed the nucleus of what has since become the Cumberland Presbyterian Church. (See PRESBYTERIANISM.) One of the most valuable products of the camp-meeting idea is the Chautauqua Assembly, a highly successful educational enterprise, which is still closely connected with religious work. (See CHAUTAUQUA.) One of the most noteworthy revivals of the whole series was that of 1858-59, which, like the Great Awakening, affected nearly all branches of Protestantism, and was nowhere more successful than in New York City. No account of modern revivals would be complete without prominently mentioning the work of Dwight L. Moody, who for many years exerted a large influence in Great Britain and America, reaching all classes of society.

What is commonly called the revival period of American religious history may be said to have closed soon after the middle of the nineteenth century. Horace Bushnell's work on *Christian Nurture*, published in its completed form in 1861, was undoubtedly a sign of the changing religious temper. Men's minds were turning to other ways of extending the Church's influence as being at once more normal and more promising. The establishment of several theological schools, like Andover, Bangor, Hamilton, Newton, and others, due largely to the interest evoked by the revivals early in the century, tended to promote this very change.

Although revivals mark a temporary departure from the historic method of propagating Christianity, which is by religious training accompanying the sacrament of baptism, yet they are a natural incident in the development of Protestantism. Most of the Protestant churches require some evidence of regeneration before admitting members into their fellowship, and this evidence is most naturally sought in religious experience, especially in the process of conversion. This is commonly understood to mean such a change of heart and disposition, often sudden, as can be wrought only by the operation of Divine grace. This idea laid firm hold upon many American churches, so that conversion came to be regarded as the normal mode of entrance upon the religious life. Baptism continued to be administered, but the significance of infant baptism was largely lost sight of, and the historic system of catechetical instruction generally disappeared. No student of the subject can doubt that large numbers of the conversions were genuine, or that the system of evangelizing, in the hands of earnest and sincere men, has been productive of great benefit to humanity; but, on the other hand, it is impossible to doubt that grave abuses have appeared in connection with it. Such purely physical phenomena as swoons, outcries, and convulsions were confounded with spiritual experiences. These are now known to belong to the domain of pathology, and to indicate a psychophysical condition, often met with elsewhere in the history of religion and of civilization.

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REVOCATION (Lat. *revocatio*, from *revocare*, to revoke, recall, from *re-*, back again, anew + *vocare*, to call). In law, the annulling, vacating, or cancellation of a legal instrument with intent to make it null and void in effect, or the withdrawal of an authority previously conferred. Where an instrument is made in good faith, and without wrongfully affecting the rights of third parties, it is generally held to be irrevocable, if it conveys property or rights to some one who pays for the same or accepts them as a gift. Powers not coupled with an interest in the donee are revocable.

REVOLT OF ISLAM, THE. A poem by Shelley (1818). The original title was *Laon and Cythna*, the names of the chief characters of the story, telling of a nation roused to freedom by a young poet. His triumph is brief, for the hero, Laon, is condemned to be burnt, and his martyrdom is shared by Cythna. The regeneration of society, an echo of the French Revolution, is the leading idea.

REVOLUTION (Lat. *revolutio*, from *revolvere*, to turn over, from *re-*, back again; anew + *volvere*, to turn; connected with Goth. *walwjan*, AS. *wealwian*, Eng. *wallow*). In politics, a radical change in the fundamental constitution of a State, as opposed to reform, which implies a gradual transformation carried out in accordance with established principles and through legal forms. Usually, though not of necessity, it connotes a popular upheaval in which the will of the masses replaces for the time all laws and authority. The history of every nation presents instances where the organic growth of years and centuries has within a brief space of time been altered or destroyed by a people that has lost faith in the efficacy of orderly evolution. The English Revolution of the seventeenth century once for all established the rights of the nation as against its ruler. The American Revolution, so called, freed the united English colonies on the Atlantic seaboard of North America from the sovereignty of the English Crown and made them free and independent States. The French Revolution of 1789 overthrew the Bourbon monarchy and after three generations of sequential struggles brought in the sovereignty of the French people. It produced a profound effect on the constitution of society and the relation of peoples and sovereigns throughout Europe. On the technical aspect of revolutions in the science of politics, consult: Locke,

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Essay on Government; Burgess, *Political Science and Comparative Constitutional Law* (2 vols., Boston, 1896). On its historical aspects, see the history of different nations. See also Lilly, *A Century of Revolution* (London, 1890).

REVOLUTIONARY TRIBUNAL. The name given to the court for the trial of political offenses instituted by the French Convention on the night of March 10, 1793. The name was proposed by Cambacérès. Danton and his associates considered that such a court had become necessary, inasmuch as the disasters which had befallen the national armies on the frontiers had led to dangerous conspiracies against the revolutionary Government. Its members were chosen from the various departments, and their appointment was ratified by the Convention. Their function was to sit in judgment on all persons accused of crimes against the State, and from their sentence, delivered with appalling promptitude, there was no appeal. During the Reign of Terror, when Fouquier-Tinville (q.v.) was the public prosecutor, this tribunal acquired a fearful notoriety by doing away with almost all forms of justice, and making itself the willing instrument of the Committee of Public Safety. After several changes in organization, the Revolutionary Tribunal was finally abolished, May 31, 1795. See FRENCH REVOLUTION.

REVOLUTIONARY WAR. See UNITED STATES.

REVOLVER, MILITARY. The military revolver is a weapon of much disputed value, as is shown by its varying relative importance in the armies of the world. It has, perhaps, found a greater sphere of usefulness in the United States cavalry than with any other troops in the world. The ordinary range of usefulness of the service revolver—if judged by the sighting of those now in general use—is practically limited to 50 yards, the weapon itself being required to be strong enough to stop a man, and if possible a horse. The responsible authorities of the great military powers remain officially faithful to revolvers of over .40 calibre, and bullets of from 180 to 313 grains; although their officers are often supplied, or supply themselves, with lighter and less bulky weapons of reduced calibre. This is especially true of British officers. The United States Colt, calibre .38, fires a bullet lighter by nearly 30 grains than that of any other power, with the exception of those used by the Swiss dismounted officers, French officers, and the revolvers of the new Russian model. Its cylinder contains six chambers, and in order to facilitate the loading of cartridges and the simultaneous ejection of the emptied shells the cylinder is mounted upon a crane pivoted in the frame below the cylinder, so that on drawing the cylinder latch to the rear the cylinder swings to the left and downward out of its seat in the frame. Thus, all the chambers are exposed for loading, while the pressure against the end of the ejector rod under the barrel forces out the shells. This done, the cylinder is returned to its position in the frame and is automatically secured by the cylinder latch. One of the most important American revolvers is the *Smith and Wesson*. Formerly, Smith and Wesson revolvers were constructed in calibres from .22 to .45, but about the year 1890 the .22 calibre was discontinued. These revolvers are equipped with an automatic shell ejector, so that when the revolver is opened by its clasp the barrel and cylinders tip downward, an action which simultaneously ejects the empty shells. This mechanism is one of the most important inventions ever made in connection with revolvers, and has been adopted by practically all the revolver manufacturers throughout the world, since the patents covering the invention expired. The Army Model Number 3, made by Smith and Wesson, weighs 2½ pounds, is central fire, with a calibre of .44. It takes six cartridges and has a length of barrel of 6½ inches.

All American pistols and revolvers use metallic cartridges. Although it is conceded that if loaded a certain way the breech-loading revolver has no advantage over the muzzle-loader, and even though it is admitted that the muzzle-loading pistol charged as are dueling pistols gives better results than a breech-loading pistol of the same weight, length of barrel, and bore, loaded with a factory metallic cartridge, yet, owing to the great amount of labor necessary to load them, they are, as a rule, unpopular with pistol-shots, and naturally are out of the question for military purposes. The mark IV. .445 service model revolver of the Webley and Scott Revolver Company was adopted in 1893 by a joint War Office and Admiralty committee for the exclusive use of the British Army and Navy, as well as the Indian and Colonial forces. It weighs 2 pounds 3 ounces, and has a 4-inch barrel. The cylinder may be locked or free as desired, a good feature of the weapon being its combination of the trigger action with the cocking action. As already stated, the British officer selects and purchases his own weapon, and since the advent of the automatic pistol a general need was felt for a revolver which should be capable of approaching the rapidity of fire of the automatic pistol. Since 1901 the Webley-Fosbery revolver has made its appearance, and has the great advantage of taking the regular service ammunition. See PISTOL; and Plate of PISTOLS AND REVOLVERS.

REVUE DES DEUX MONDES, re-vụ′ dȧ dē mȯnd (Fr., Review of the two Worlds). The most important French magazine, founded in 1831 by F. Buloz, and now conducted by Brunetière. It is a bi-monthly and numbers among its contributors the leading French writers in literature, art, politics, and history.

REWA KANTHA, rā′wȧ kän′thȧ. A collection of 61 native States, constituting a British political agency, in the Gujarat division of Bombay, India. The combined area is 4980 square miles, and the population in 1901 was 478,889 having fallen off from 733,506 in 1891.

REWARD (OF. *rewarder, reswarder, reguarder, regarder,* to regard, from *re-*, back + *warder, garder,* to watch, mark, heed, guard, from OHG. *wartēn,* Ger. *warten,* AS. *weardian,* Eng. *ward;* connected ultimately with Gk. *ὁρᾶν, horan,* to see). A compensation or premium offered by a government or a private individual to the public in general for the performance of a particular act specified therein. In England, statutes forbid the offering or receiving of a reward for the return of stolen property under conditions protecting or sheltering the thief. In the United States compounding a felony is a crime, but the English

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statute prohibiting the receiving back of property believed to have been stolen, without investigation, is not generally followed. The offer of a reward may be made verbally, by writing, or in the newspapers, and when made to the public indefinitely, may be accepted by any one who may see the offer. The various States differ as to whether one performing the service without having seen the offer is entitled to the reward. Where the offer of a reward is made in the newspapers, it may be withdrawn or revoked in the same way, and one who saw the offer, but did not see the revocation and performed the service called for, is not entitled to recover. The general principles of contracts govern, and the performance of the service requested completes a unilateral contract, on which an action can be maintained. One who goes to great trouble and expense to get the desired information, but does not succeed in doing so until after the offer is revoked, is without remedy. A police officer cannot recover a reward offered for the detection of a criminal, if his efforts were in the line of his duties; but if his services were not in any sense official, and were performed in his leisure time, he may claim such a reward just as any other individual could do. Consult the authorities referred to under CONTRACT.

REWARI, or **RIWARI**, rē'wä-rē'. The chief commercial town of the District of Gurgaon, Punjab, British India, 48 miles southwest of Delhi, at the junction of two railways (Map: India, C 3). It has a fine town hall, handsome Jain temples, and the interesting ruins of the fort of Gokulgarh. It is an important grain-distributing centre; sugar and salt are also exported, and great quantities of iron are imported for manufacturing purposes. Rewari dates from about B.C. 1000, when it was built near the site of an older town, ruins of which exist on the east. Population, in 1891, 27,900; in 1901, 27,300.

REWBELL, rē'bĕl', JEAN FRANÇOIS (1747-1807). A French politician, born at Colmar, Alsace. He practiced law, became president of the corporation of advocates, was elected as a Deputy of the Third Estate to the States-General for the District of Colmar, and in the National Assembly became known for his knowledge of jurisprudence, his bold Republicanism, and his denunciations of Royalist conspiracies. In 1791 he became president of the Assembly, afterwards was general secretary to the directory of Haut-Rhin, and in 1792 was elected to the Convention. He was an opponent of the Jacobin Club, to whose suppression in November, 1794, he greatly contributed; was a member of the Committee of Public Safety and was elected to the Council of Five Hundred. In November of 1795 he became a member of the Directory, in which he exercised great influence on matters of finance and justice. He was elected president of the Directory in 1796, and was chosen by lot to retire in May, 1799. He sat in the Council of Ancients, but after the coup d'état of the Eighteenth Brumaire (November 9, 1799) withdrew from public life. Consult the standard works on the French Revolution, and Sciout, *Le Directoire* (4 vols., Paris, 1895-97).

REYBAUD, rā'bō', LOUIS (1799-1879). A French author and politician, born at Marseilles. He entered journalistic work, and settled in Paris in 1829. Besides editing a *Histoire scientifique et militaire de l'expédition française en Egypte* (10 vols., 1830-36), he published *Etudes sur les réformateurs ou socialistes modernes* (1840), which won the Montyon prize: a satirical romance, entitled *Jérôme Paturot à la recherche d'une position sociale* (1843); and a satire on Revolutionary ideas, *Jérôme Paturot à la recherche de la meilleure des républiques* (1848).

REYER, rā'yâr', LOUIS ETIENNE-ERNEST (1823—). A composer of the modern French school. His real name was Rey. He was educated in the municipal schools. In 1850 he produced *Le Sélam*, a symphonic ode with chorus, set to a poem by Théophile Gautier. Several operas followed, one of the most conspicuously successful being *La Statue* (1861). He was elected to the Académie in 1876, and about the same time succeeded Berlioz as librarian at the Paris Opéra. Meanwhile he gained considerable reputation as a feuilletoniste on the *Journal des Débats*, and through his essays published in 1875 under the collective title of *Notes de musique*. In 1862 he was made a chevalier of the Legion of Honor, and he became an officer of that order in 1886. His compositions include: operas, *Maître Wolfram* (1854), *Sacountala* (1858), *Erostrate* (1862), *Sigurd* (1884), *Salammbô* (1890); cantatas, *Victoire* (1859), *L'Union des arts* (1862), *L'Hymne du Rhin;* and male choruses.

REYKJAVIK, rik'yä-vĕk'. The capital of Iceland, situated on the southwest coast of the island at the head of the Faxa Fjörd (Map: Denmark, F 1). It consists chiefly of wooden houses, and has a small cathedral, a classical college, a theological seminary, and a medical school. In the house of the Althing are a library and a collection of Icelandic antiquities. During the summer there is steam communication with Copenhagen. Population, in 1901, 6682.

REYNARD (rā'nĕrd) **THE FOX.** The greatest mediæval beast epic, in which animals become the mouth-pieces of human society. Versions of this epic are found in the chief languages of Western Europe. The narrative is made up of stories derived from European folk-lore and of more or less literary survivals of the Æsopic fable. Though the first extant signs of the epic date back to 940 (*Ecbasis Captivi*), the various elements of the tale did not group themselves into a whole until the twelfth century. In the Latin *Isengrimus*, which is, however, mainly of literary origin, the animals already have specific names. The principal character is Reynard (from the Germanic Raginohard, meaning 'the wily, the crafty one')—the fox, whose deadly enemy is Isegrim (probably German *eisen* and *grimm*, signifying 'strength,' 'endurance')—the wolf. About these two and their bitter feud are found grouped: Noble the lion, Bruin the bear, Tibert the cat, Baldwin the ass, Chanticleer the cock, Kyward the hare, etc. The fact that *Isengrin* was used in 1112 as the epithet of a man (one of the conspirators against Gaudry, Bishop of Laon) shows that the tale was popularly current at an early date. The French *Roman de Renard*, a lost version of which was probably the source of most of the other European versions, is a cycle of episodes in octosyllabic verse, compiled by various authors at various epochs. The narrative is there divided into 'branches,' thirty in number,

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which together constitute over 30,000 verses. The oldest manuscript of this compilation is of the end of the thirteenth century, but we have a German poem of the twelfth century, modeled on an earlier version of the same French work. Various 'Trouvères' attempted to give shape to this material, though the romance never attained genuine unity. The names of three alone of these compilers have been handed down: Pierre de Saint Cloud, Richard de Lison, and a clerk who called himself *Prestre de la Croix en Brie*. These names indicate that the Ile de France, Champagne, Normandy, and Flanders are the localities where the various parts of the poem took shape. The gist of the tale, in this completed form, is that the Fox has given offense to the Wolf and to several other animals, for which reason he is called before the court of justice held by the Lion. At first he refuses to come and through trickery rids himself of those sent after him. Finally, when forced to appear, he pretends repentance and is pardoned by the Lion. The offense, however, is repeated in a different form and again the Fox goes free. At last the Wolf in despair challenges him to single combat. Here again the craft of the Fox gains a complete victory, which ends in his being recognized as the real master of beasts.

In the fourteenth century the story was again taken up and given a number of remodelings on French soil; chief among these are *Renart le Nouvel*, by Jacquemard Gelée, and the famous *Renart le Contrefaite*, by an unknown clerk of Troyes. Here the romance has become a veritable compendium of moral, historical, and political ideas expounded by Reynard in conversation.

The romance was very popular in foreign lands. It was translated into Middle High German in 1180 by the minnesinger Heinrich der Glichesäre; it was imitated in Catalonia by Raymond Lulle and given an English form (published by Caxton) and a Flemish form. Goethe modernized the German version in his *Reinecke Fuchs* (translated by T. J. Arnold). Mediæval art delighted in depicting scenes from the *Renard*.

For a detailed bibliography, consult: Ernest Martin, *Le roman de Renarte* (Strassburg-Paris, 1882-87), and Potvin, *Le roman du Renard* (Paris, 1891). The best edition of the French version is that of Martin, *op. cit.;* the German *Reinhart Fuchs* is edited by Reissinger (Halle, 1886), the Flemish verse version *Reinaert de Vos*, by Van Helten (Groningen, 1887), and Caxton's English version is edited by Thoms, Percy Society (London, 1844). For questions of sources, etc., consult: Sudre, *Les sources du roman de Renarte* (Paris, 1893); id., in Petit de Julleville, *Histoire de la langue et de la littérature française*, vol. ii. (Paris, 1896); G. Paris, *Le roman de Renard* (ib., 1895); F. S. Ellis, *History of Reynard the Fox* (London, 1894); and T. Jacobs, *Reynard the Fox* (ib., 1895).

REYNAUD, rā'nō', Jean Ernest (1806-63). A French philosopher and author, born at Lyons. He was at first a mining engineer, but came into public notice as an opponent of Saint-Simonism, his previous creed, in a series of articles in the *Revue encyclopédique*. His chief work, *Terre et ciel* (1854), is a résumé of the ideas he had already set forth in the *Encyclopédie nouvelle*, which he and M. Pierre Leroux had founded in 1835, and he published also *Minéralogie des gens du monde* (1834); *Considérations sur l'esprit de la Gaule* (1847); *Vie et correspondance de Merlin de Thionville* (1860); and *Etudes encyclopédiques* (1866).

REYNOLDS, rĕn'oldz, George William MacArthur (1814-79). An English politician and author. He was educated at the Royal Military College at Sandhurst (1828-30). Disliking the prospect of a military career, he left before completing his studies and traveled on the Continent, acquiring a wide knowledge of the most modern French literature. *The Youthful Impostor* (1835), his first novel, was followed by a volume of translations from Hugo (1836), and by two volumes of essays entitled *Modern Literature of France* (1839). In 1846 he became editor of the London *Journal*, for which he wrote *The Mysteries of London* in imitation of Eugène Sue's *Mysteries of Paris*. In the same year he started *Reynolds's Miscellany*, to which he contributed during the twenty-three years of its life many sensational tales. He took a leading part in the Chartist movement and was one of the last to abandon its cause. In 1850 he started the still existing *Reynolds's Weekly Newspaper*, an organ of the laboring classes.

REYNOLDS, Henry Robert (1825-96). An English Congregational minister, born at Romsey, Hampshire. He studied at Coward College and at the London University (1841), and five years afterwards was ordained to the charge of a church at Halstead, Essex, but continued his studies, and graduated in 1848. His second pastorate was in Leeds (1849), with intervals of Continental travel until he became president of Cheshunt College (1860-94). He was associate editor of the *British Quarterly Review* in 1866-74, edited the *Evangelical Magazine* in 1877-82, and published: *The Philosophy of Prayer* (1881); *Buddhism* (1886); and *Athanasius* (1889).

REYNOLDS, James Emerson (1844—). An Irish chemist, born in Booterstown, County Dublin, and educated at Dublin University. He was chosen professor of chemistry to the Royal Dublin Society in 1870, to the Royal Irish College of Surgeons in 1873, and in Dublin University in 1875. Reynolds discovered thiocarbamide and many other compounds of the same class, and published *Lectures on Experimental Chemistry* (1874) and *General Experimental Chemistry* (1880).

REYNOLDS, John. See Rainolds, John.

REYNOLDS, John Fulton (1820-63). An American soldier, born at Lancaster, Pa. He graduated at West Point in 1841, was assigned as brevet lieutenant to the artillery, and during the Mexican War participated in the defense of Fort Brown and the battles of Monterey and Buena Vista. At the outbreak of the Civil War he was commandant at West Point. He was commissioned brigadier-general of volunteers in August, 1861, and was given a brigade of the Pennsylvania Reserve Corps before Washington. The next year he took part in both the Peninsula and Northern Virginia campaigns, and during the succeeding Maryland campaign commanded the Pennsylvania Volunteer Militia for the defense of his native State. In November he was given the command of the First Corps of the Army of the Potomac and was promoted to be major-general of volunteers. He took part in Meade's at-

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tack on the Confederate left at Fredericksburg, and at Gettysburg arrived on the field about two hours after the fighting had begun on the first day of the battle and was in chief command on the field until late in the morning (July 1st), when he was shot and instantly killed by a Confederate sharp-shooter.

REYNOLDS, JOHN HAMILTON (1796-1852). An English poet, born at Shrewsbury, Shropshire. After a secondary education, he entered in a minor capacity an insurance office, and in 1814 published two books of verse, *Safie, an Eastern Tale*, inscribed to and qualifiedly praised by Byron, of whose manner it was a frank imitation; and *The Eden of Imagination*, in the style of Wordsworth and Hunt. In 1818 he obtained a post in a solicitor's office, and in the year following published a moderately skillful parody of Wordsworth's style a poem called *Peter Bell* (thus antedating the actual publication of Wordsworth's poem of the name). He was at one time a proprietor of the *Athenæum*, and about 1838 removed to the Isle of Wight, where he was clerk of the county court. His best work is to be found in *The Garden of Florence, and Other Poems* (1821).

REYNOLDS, JOSEPH JONES (1822-99). An American soldier, born at Flemingsburg, Ky. He graduated at West Point in 1843, was brevetted second lieutenant of artillery, and from 1846 to 1855 was a member of the faculty at the Military Academy. In 1857 he resigned and became professor of mechanics and engineering at Washington University, Saint Louis, but three years later gave up this position to become a merchant at Lafayette, Ind. At the outbreak of the Civil War he entered the Federal service as colonel of the Tenth Indiana Volunteers and a month later was commissioned brigadier-general of United States Volunteers. In January, 1862, he again resigned, in August was again commissioned colonel, and in September was again promoted to brigadier-general. In November he was advanced to be major-general, and in 1863 participated in the battles of Chickamauga and Chattanooga. From January 6 to June 16, 1864, he commanded the defenses of New Orleans. He was mustered out of the volunteer service in 1866, and was reappointed colonel of the Twenty-sixth Regular Infantry. A year later he was brevetted major-general and in 1877 retired from active service.

REYNOLDS, Sir JOSHUA (1723-92). The most celebrated English portrait painter. He was born at Plympton, Devonshire, July 16, 1723. His father was the Rev. Samuel Reynolds, rector of Plympton, Saint Mary, and master of the grammar school. He intended his son for the medical profession, but Joshua, having manifested from an early age an ardent desire to be a painter, was, in 1741, placed under Hudson, the principal portrait painter of the day. After being in the studio of this artist two years he commenced on his own account as a portrait painter at Plymouth Dock, now Devonport, and met with great encouragement. In 1745 he went to London and established himself in Saint Martin's Lane; but on the death of his father in 1746 he returned to Plymouth Dock. Upon the invitation of Commodore Keppel, who was in command of the Mediterranean squadron, he sailed for Italy from Plymouth in 1749, and on his arrival in Leghorn, proceeded to Rome. He stayed about three years in Italy, most diligently employing his time in visiting the various cities where the chief art collections are to be found. Upon his return to London in 1752 his works attracted great attention, eclipsing everything that had been done there since Van Dyck's time. When the Royal Academy was instituted in 1768 he was elected president; he was knighted by George III., and on Ramsay's death in 1784 succeeded him as painter to the King. He founded the Literary Club (1764) for Dr. Johnson's benefit. To him Goldsmith dedicated his *Deserted Village*. He died in his palatial house in Leicester Square on February 23, 1792, and after lying in state at the Royal Academy, was interred in the crypt of Saint Paul's.

Sir Joshua was very prominent in the social world and lived in friendly intercourse with Johnson, Burke, Goldsmith, Gibbon, Garrick, and other leading men of his period. His principal literary works consist of fifteen *Discourses Before the Royal Academy* (1778), treatises on the history of art of a high critical and artistic value. They are written in a precise, good style, and inculcate those maxims of art commonly known as academic.

The formative influence in Reynolds's art was the great Italian masters, especially the Venetians, Correggio, the Bolognese Eclectics, and Michelangelo. He was much of an eclectic himself, and there was little that was strikingly original about his work. His composition and brush work were learned, but his drawing, especially of the limbs, was often faulty. The strong point of his paintings was their color, showing the influence of Titian; but Sir Joshua's technical experiments had a disastrous result upon their preservation. His portraits are admirable realistic representations; the men are strong in action and character, the women gentle and pure, the children innocent and natural. They form an epitome of London society of his day.

He is estimated to have painted from two to three thousand portraits, most of which are in English private collections. The National Gallery, however, possesses a number of his best works, including those of Admiral Keppel, Lord Heathfield, the Hero of Gibraltar, Goldsmith, Dr. Johnson, Garrick, the members of the Dilettante Society, and three portraits of himself. The National Portrait Gallery (London) and the Royal Academy are rich in his works, as are also the London private galleries and the University of Oxford. Especially worthy of mention are the portraits of Lady Cockburn and her children, the Duchess of Devonshire (Devonshire House), Nelly O'Brien (Hertford House), and "Mrs. Siddons as the Tragic Muse" (Dulwich Gallery).

Although Sir Joshua preferred historical painting, his works of this character are less important. There are good examples in the Hermitage Collection, Saint Petersburg, including the "Continence of Scipio;" the best, perhaps, is "Ugolino and His Sons in the Tower." Among his few genre pictures are the "Girl with the Mousetrap" (Holland House), and the "Strawberry Girl." His beautiful and well-known "Angels' Heads" (National Gallery) are in reality portrait studies. There are also good examples of Reynolds's work in the principal American collections.

BIBLIOGRAPHY. The older biographies of Rey-

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nolds, those of Malone (1798), Northcote (1813), Farrington (1819), Beeche (1835), and Cotton (1856), have been superseded by the comprehensive *Life* by Tom Taylor (London, 1865), which also includes the researches of Leslie. Other good biographies are those of Chesnan (Paris, 1887), Phillips (London, 1893), and Gower (ib., 1902).

REZONVILLE, re-zôn vêl'. A village of German Lorraine, 10 miles west-southwest of Metz and 2 miles southwest of Gravelotte. The battle of Gravelotte (q.v.) is sometimes called the battle of Rezonville.

RHACHITIS, rȧ-kī'tĭs. See RICKETS.

RHAD'AMAN'THUS (Lat., from Gk. Ῥαδάμανθος). In Greek legend, a son of Zeus and Europa, and brother of Minos (q.v.). In Homer and the older epic, Rhadamanthus is a hero, who by special favor of the gods has been translated, with others, to Elysium or the Islands of the Blest. In later story these islands become the kingdom of Cronos and the released Titans, and Rhadamanthus, married to Alcmene, mother of Hercules, holds high rank and sits as judge. Another conception of the other world prevailed later, in which Rhadamanthus, with Minos, Æacus, and Triptolemus, because of their justice in this life, sit in judgment on the souls of the dead, and assign them their due meed of bliss or punishment

RHADAMES, răd'ȧ-mēz. An oasis and town in North Africa. See GADAMES.

RHÆTIA, rē'shĭ-ȧ, or better, **RÆTIA.** A Roman province lying in the Alps, north of Italy and east of Helvetia, and bounded north by Germany and east by Noricum, thus embracing the Grisons and part of Tyrol. It was watered by the Rhine, Athesis (Adige), and Ænus (Inn). The natives were chiefly engaged in herding sheep and cattle. They were a hardy and warlike race, but were conquered about B.C. 15 by the Romans under Tiberius and Drusus. Later Vindelicia, to the north, was united with Rhætia. The chief town of Rhætia proper was Tridentum (Trent); and of Vindelicia, Augusta Vindelicorum (Augsburg).

RHÆTIC BEDS. A series of strata forming the uppermost portion of the Triassic system, which is extensively developed in the Rhætian Alps.

RHAMNACEÆ (Neo-Lat. nom. pl., from Lat. *rhamnos*, from Gk. ῥάμνος, buckthorn, Christ's-thorn), BUCKTHORN FAMILY. A natural order of about 40 genera and 500 species of dicotyledonous, often spiny trees or shrubs, natives of and wildly distributed in temperate and tropical countries. They have simple leaves; small, generally green flowers; and either fleshy fruit, not opening when ripe, or dry and separating into three parts. Some species have been used in dyeing (buckthorn), some in medicine (red root), and the fruit of some for food. (See JUJUBE.) The sweet red pulp of the thickened flower stalks of Hovenia dulcis, a native of China and Japan, is edible. In flavor they resemble the pear. The chief genera are Rhamnus, Ceanothus, Zizyphus, Hovenia, Phylica, and Gouania.

RHAMNUS. A genus of shrubs and trees. See BUCKTHORN.

RHAMPHORHYNCHUS, răm'fô-rĭŋ'kŭs (Neo-Lat., from Gk. ῥάμφος, *rhamphos*, curved beak + ῥύγχος, *rhynchos*, snout). A fossil flying reptile of Upper Jurassic age. See PTERODACTYL.

RHAMPHOSUCHUS, răm'fô-sū'kŭs (Neo-Lat., from Gk. ῥάμφος, *rhamphos*, curved beak + σοῦχος, *souchos*, crocodile). One of the largest fossil crocodiles, known by fragmentary bones found in the Pliocene deposits of the Siwalik hills of India. The animal must have attained a length over all of about 50 feet.

RHAMPSINITUS (Lat., from Gk. Ῥαμψίνιτος). A King of Egypt, the subject of a remarkable tale related by Herodotus. According to the Greek historian, Rhampsinitus possessed enormous wealth, and wishing to store it securely, caused a treasure house of stone to be built. The architect who constructed the building left a secret entrance concealed by a movable stone, and on his death bed informed his two sons of the fact. The sons repeatedly entered the treasury, and each time carried away as much of the treasure as they were able. Finally, the elder brother falls into a trap set by the King, and the younger brother, at his request, cuts off and carries away his head that he may not be recognized. The headless body is exposed, guarded by soldiers, but the younger brother, by a clever stratagem, makes them drunk and obtains possession of it. The King then attempts to capture the thief by the aid of his daughter, who is ordered to receive all who desire to visit her, promising her love to him who can relate the most remarkable adventure experienced by himself. The thief visits the princess and tells her the story of the theft, but when she attempts to seize him he slips into her hands his dead brother's arm, which he has brought under his cloak, and makes his escape. Thereupon the King, admiring his cleverness, grants him immunity for his theft, and gives him his daughter in marriage. Rhampsinitus is to be identified with Rameses III., whose treasury at Medînet Habu is the building referred to in the story of the thief. The accounts of Herodotus are derived from the popular tales and legends which, in his time, were current in Egypt.

Consult: Herodotus, ii., 121-124; Wilkinson, *Manners and Customs of the Ancient Egyptians* (London, 1878); Clouston, *Popular Tales and Fictions* (Edinburgh, 1887); Budge, *A History of Egypt* (New York, 1902).

RHAPSODISTS (from Gk. ῥαψῳδός, *rhapsōdos*, bard, from ῥάπτειν, *rhaptein*, to stitch together + ᾠδή, *ōdē*, song, from ἄδειν, *adein*, to sing). A name applied in ancient Greece to professional reciters of poetry, and especially to a class of wandering minstrels who recited the Homeric poems. So long as the Homeric lays were handed down by oral transmission, the rhapsodists were a highly respected class, and there can be little doubt that they often exercised a considerable influence upon the text of the poems. But with the commission of the poems to writing and the circulation of manuscript copies, the character of the rhapsodists gradually changed, so that in the fourth century they are represented as stupid persons, with nothing to commend them but a retentive memory. Their recitations, however, continued to be popular until a comparatively late period. The rhapsodist carried a staff, and when reciting wore a crown as a mark of his office. He did not confine himself to mere recitation, but commented upon the poet's meaning and discussed questions of interpretation.

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Each recitation was known as a 'rhapsody,' and hence this term is often applied to the separate books of the *Iliad* and the *Odyssey*. The most important source of information concerning the rhapsodists is Plato's *Ion*.

RHAPSODY (Lat. *rhapsodia*, from Gk. *ῥαψῳδία*, recital of poetry, portion of an epic recited at one time, from *ῥαψῳδός*, *rhapsōdos*, bard). A term in modern music, applied to an instrumental composition written in the form of a fantasia usually upon folk-songs or national melodies. The rhapsodies of Raff and Lalo, and especially the Hungarian rhapsodies of Liszt, have become famous.

RHATANY (Brazilian, Port. *ratanhia*, from Quichua *ratana*, the native name), or RATTANY, *Krameria triandra* and *Krameria Ixina*. Half-shrubby plants of the natural order Polygalaceæ, natives of the cold sterile tablelands of the Andes in Peru and Bolivia. Their roots have been used medicinally as an astringent and tonic. When powdered and mixed with orris root or charcoal the roots are used as a tooth-powder. Rhatany root is exported chiefly from Lima, Peru. It is extensively employed in Portugal to color wines, the coloring matter in the roots being known as rhatanic acid.

RHA'ZES. The Latin name of ABU BEKR MOHAMMED IBN ZAKARIYA AL-RAZI. The most important of the mediæval Mohammedan physicians. He was born about the middle of the ninth century in the Persian city of Rai. Up to his thirtieth year he devoted himself to music, and then took up the study of medicine at Bagdad. He became the head of a hospital at his native place and later at Bagdad. After his reputation was made he traveled, visiting different courts. He died either in 923 or 932. Much of Rhazes's knowledge was drawn from Greek sources, but he was more than a mere borrower and is famed as the first to describe smallpox and measles (in his book *Al-jardarī wal-haṣba*, several times translated into Latin, and into English by Greenhill, London, 1848). He is said to have written more than two hundred works; the most famous was the *Kitāb al-ṭibb al-Manṣūri*, a general treatise on medicine in 10 books. The *Kitāb al-ḥāwī* (*liber continentis*), a cyclopædia of medicine, was edited from his papers after his death. Both these works were translated into Latin in the fifteenth century. Consult: Wüstenfeld, *Geschichte der arabischen Aerzte und Naturforscher* (Göttingen, 1840); Leclerc, *Histoire de la médecine arabe* (Paris, 1876).

RHE'A (Lat., from Gk. *Ῥέα*). A Greek goddess representing the productiveness of nature and anciently identified with Cybele. She was the daughter of Uranus and Gæa, wife of her brother Cronus, and mother of Zeus, Hades, Poseidon, Hera, Hestia, and Demeter. She had an ancient place of worship in Crete, where she gave birth to Zeus on Mount Ida.

RHEA, or **REA SILVIA**. In Roman tradition, a Vestal virgin, the daughter of the Alban Numitor, and mother of Romulus and Remus, by Mars. When Amulius usurped the throne, the infants were exposed and Rhea Silvia was condemned to be buried alive for breaking the vow of chastity required of the Vestals. She was also called Ilia.

RHEA (Lat., from Gk. *Ῥέα*, daughter of Uranus and Gæa). The generic and English name of a family of South American ratite birds allied to the ostrich, from which they differ in having the feet three-toed, and each toe armed with a claw; also in being more completely feathered on the head and neck; in having no tail; and in having the wings better developed and plumed, and terminated by a hooked spur. The wings are, indeed, more efficient than in any other of the Ratitæ, although unfit for flight.

Rheas are known to Brazilians as 'ema' and to Argentineans as 'nandu,' 'avestruz,' or 'chueke.' There are two species, of which the best known (*Rhea Americana*) is considerably smaller than the ostrich, standing about three feet high. It is uniform gray, except on the back, which has a brown tint. The male is larger and darker

NANDU (*Rhea Americana*).

colored than the female. The back and rump are furnished with long feathers, much inferior to those of the ostrich in beauty as plumes, but marketable as material for dust-brooms and the like. The skins are made up into rugs, of which large numbers are fabricated in the neighborhood of Mendoza, Argentina. The rhea inhabits the great grassy plains of South America, southward of the equator, and abounds on the banks of the La Plata and its more southern tributaries. It is generally seen in small groups, usually associated with guanacos, and eating grass, seeds, berries (especially of Empetrum), worms, snails, and almost anything else it can swallow. It runs with great celerity, using its wings in aid. It is polygamous, one male securing possession of two or more females, which lay their eggs together in a mere hollow, where, when 20 or 30 are gathered, they are incubated by the cock.

A smaller and more recently discovered species (*Rhea Darwini*) has light brown plumage, each feather tipped with white. It inhabits Patagonia, and extends northward along the base of the Andes to the edge of Peru, and differs from the other in many particulars. A third species has been catalogued, but it is now considered a dark, local race (variety *Macrorhyncha*) in Northeastern Brazil of the ordinary nandu.

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Excellent portraits and descriptions of the three forms may be found in the *Transactions* of the Zoölogical Society of London, vol. iv. (1862). Consult also: Darwin, *A Naturalist's Voyage* (London, 1860); Sclater and Hudson, *Argentine Ornithology* (ib., 1889).

RHEA, or **RAMIE, FIBRE.** See RAMIE.

RHEGIUM, rē'jĭ-ŭm. The ancient name of a city of Magna Græcia, Italy, now known as Reggio di Calabria (q.v.).

RHEGIUS, rē'jĭ-ŭs (Latinized form of his family name, *Rieger;* the form *Regius*, as if from *König*, king, is incorrect), URBANUS (1489-1541). A Protestant Reformer. He was born at Langenargen, on Lake Constance, studied at Freiburg, and at first was professor of rhetoric and poetry at Ingolstadt; later he turned to theology, entered the priesthood of the Catholic Church, and became a doctor of theology at Basel. In 1520 his views underwent a change and while cathedral preacher at Augsburg he wrote satirical pieces against the Church and openly preached Lutheran views. In 1521 he was removed, but in 1524 was again preacher in Augsburg, and so remained till the diet held there in 1530. When the Emperor had silenced the evangelical preachers of the city, he entered the service of Ernest, Duke of Brunswick-Lüneburg, and removed to Celle, where he died. In the Eucharistic controversy he wavered, but finally decided for Lutheran views. His Latin works appeared at Nuremberg in 1561, three parts; his German in four parts, in 1562; again at Frankfort, 1577. Of these works the best known are: *Formulæ Caute Loquendi* (1535; in German, 1536; last ed. by Steinmetz, Celle, 1880); *Dialogue von der trostreichen Predigt* (1537), a devotional work much read even in the seventeenth century; *De Restitutione Regni Israelitici* (1536; Ger. trans.). Consult his *Life* by Uhlhorn (Elberfeld, 1861); and Steitz, *Die Theologie des Urbanus Regius, speziell sein Verhältnis zu Luther und zu Zwingli, 1521-23* (Gotha, 1898).

RHEIDT, rīt. A town of Prussia. See RHEYDT.

RHEIMS, or **REIMS**, rēmz, *Fr. pron.* rāns. The capital of an arrondissement in the Department of Marne, France, situated on the Vesle, 107 miles by rail east-northeast of Paris (Map: France, L 2). The vine-clad Montagne de Rheims and adjacent hills rise on the south and west, and detached forts at various points surround the city. The mediæval ramparts have been replaced by tree-lined boulevards, but some of the ancient gateways have been preserved, of which the most noteworthy is the Porte de Paris. The town is well built, the material used being limestone, of the district, which, with the prevalence of the older style of domestic architecture, gives the place a picturesque appearance. There are many quaint old houses. The most striking public building is the thirteenth-century cathedral, which, although it still lacks the towers of the original design, is one of the finest extant specimens of Gothic architecture. It is 453 feet long. The elaborate west façade has 500 statues and a splendid rose window, and is flanked by two towers. Scarcely less beautiful is the north portal, with its sculptures. The cathedral is famous as the church in which the French kings were crowned. The eleventh-century Romanesque Abbey Church of Saint Remy is of nearly equal size. Other interesting buildings are the hospital occupying the ancient Abbey of Saint Remy, the fifteenth-century archiepiscopal palace with a museum of sculpture, and a handsome hôtel-de-ville, begun in 1627, containing the public museum and library of over 80,000 volumes. The Porta Martis, a Roman relic, is a fine triple triumphal arch of the fourth century in a fair state of preservation. The chief modern educational institutions are the lyceum and a preparatory school of medicine and pharmacy. Rheims is one of the principal entrepôts for the wines of Champagne. It is a great centre of woolen manufactures.

Rheims is built on the site of *Durocortorum*, or *Civitas Remorum*, the capital of the Remi. On the Montagne de Rheims, south of the city, are a number of Gallo-Roman remains. Under the Frank rule Rheims was a place of much importance, and it acquired a religious interest from its having been the scene of the baptism of Clovis and his chief officers by the Bishop, Saint Remy, in 496. In the eighth century it became the seat of an archbishopric, and from 1179, in which year Philip Augustus was solemnly crowned there, it was the place for the coronation of the kings of France down to the time of Charles X. The town suffered severely during the campaign of 1814, and on September 4, 1870, was occupied by the Germans. Population, in 1901, 108,385. Consult: Marlot, *Histoire de Reims* (Rheims, 1843-45); Justinus, *Reims, la ville des sacres* (Paris, 1860); Gosset, *Cathédrale de Reims* (ib., 1894).

RHEINBABEN, rīn'bä-ben, GEORG, Baron von (1855—). A Prussian statesman, born at Frankfort-on-the-Oder. He studied law and political science at Heidelberg and Berlin, became referendary at the district court at Erfurt, in 1877, government assessor in Schleswig, in 1882, was appointed to an assistant position in the Ministry of Finance in 1885, and promoted rapidly to higher offices until, in 1896, he became president of the Government board at Düsseldorf. Made Prussian Minister of State and Secretary of the Interior in 1899, he succeeded Miguel as Minister of Finance in 1901.

RHEINBERGER, rīn'bĕrk-ēr, JOSEPH (1839-1901). A German organist and composer, born in Vaduz, Liechtenstein. He received the greater part of his musical education at the Royal School of Music, Munich, where he subsequently taught the organ, counterpoint, and composition. He was organist of Saint Michael, conductor of the Oratorio Society, repetitor at the Court Opera, and Court kapellmeister, and he was regarded as one of the greatest theory and organ teachers of his time. His music is essentially German in character, but somewhat too heavy to be popular. His organ sonatas and other compositions for that instrument are especial favorites in America. His compositions include: *Christophorus*, oratorio; *Toggenburg* and *Waldmorgen*, cantatas; *König Erich*, ballad for chorus with pianoforte; *Wittekind*, and *Das Thal des Espingo*, chorus; the *Wallenstein* and *Florentine* symphonies; overtures, pianoforte, chamber, organ, and orchestral music; and the operas *Die sieben Raben* (1896) and *Türmers Töchterlein*.

RHEINE, rī'ne. A town in the Province of Westphalia, Prussia, on the Ems, at the head

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of navigation, 24 miles by rail north-northwest of Münster (Map: Germany, B 2). It is known principally for its manufactures of cotton, jute, linen, tobacco, and machinery. Population, in 1900, 10,371.

RHEINFELS, rīn'fĕls. The largest and one of the most beautiful of the ruined castles on the Rhine. It was built in 1245 by the Count of Katzenelnbogen, one of the petty barons of the Rhine. In modern times it was a strong Hessian fortress. In 1794 the French gained possession of it and blew it up in 1797. It is now the property of the Emperor of Germany.

RHEINGOLD, rīn'gôlt, DAS. The first division of Richard Wagner's music drama *Der Ring des Nibelungen*. It was first given in Munich, September 22, 1869. See RING OF THE NIBELUNGEN.

RHEINHOLD, rīn'hôlt, HUGO (1853—). A German sculptor, born at Oberlahnstein, Hesse-Nassau. For several years he pursued a mercantile career in San Francisco and in Hamburg, before devoting himself to art in Berlin, under Max Kruse, and at the Academy under Herter, with signal success, as proved by his marble group, "By the Wayside," in the National Gallery, Berlin, and the large group in bronze, "Dynamite in the Service of Civilization," at the Nobelhof, Hamburg.

RHENANUS, rā-nā'nus, BEATUS (1485-1547). A German classical scholar, whose real name was Bild von Rheinau. He was born at Schlettstadt, Alsace, and after studying at the University of Paris, spent most of his life in his native city. He was an intimate friend of Erasmus. His works, which show great critical acumen, include editions of *Plini Epistolæ* (1514); Tacitus (1519); Tertullian (1521); and Livius (with Gelenius, 1535), the *editio princeps* of *Villojus Paterculus* (1522); and an historical work, *Rerum Germanicarum Libri Tres* (1531), which was considered the finest piece of historical research of his day. He was the first to question the authenticity of the *Dialogus* of Tacitus. Consult: Horawitz, *Beatus Rhenanus* (Vienna, 1872); *Des Beatus Rhenanus litterarische Thätigkeit* (ib., 1872); *Die Bibliothek und Korrespondenz des Beatus Rhenanus* (ib., 1874); and Knod, *Aus der Bibliothek des Beatus Rhenanus* (Leipzig, 1889).

RHENISH ARCHITECTURE. See ROMANESQUE ART, section *Germany*.

RHENISH CONFEDERATION. See CONFEDERATION OF THE RHINE.

RHENISH PRUSSIA. A province of Prussia. See RHINE PROVINCE.

RHENSE. A village of Prussia in the circle of Coblenz, on the Rhine, noted historically as the meeting-place of a diet, which, in July, 1338, during the struggle between the Emperors and the Papacy, took a firm stand for the former by declaring that whoever had received a majority of electoral votes was *ipso facto* German King and Holy Roman Emperor without further Papal confirmation.

RHEOTROPISM (from Gk. ῥεῖν, *rhein*, to flow + τροπή, *tropē*, turn). The imperfectly understood sensitiveness which enables plant organs, especially roots, to bend their tips either toward or away from the source of a current of water in which they are placed. Negative rheotropic curvatures are often merely gross mechanical effects of the force of the stream. But positive curvatives (i.e. toward the source) are undoubtedly due to a specific reaction on the part of the organ. Positive rheotropism of roots, is exhibited well by seedlings of the radish, maize, and Vicia sativa. To demonstrate this phenomenon seedlings with roots about 2 centimeters long need only to be affixed to the sides of an inclined wooden trough in which a current of water is flowing. In spite of the tendency of gravity and the force of the moving water to cause roots so immersed to grow downward, they will, after a few hours, bend up stream.

RHE'SUS (Lat., from Gk. Ῥῆσος). (1) A Bithynian river god, son of Oceanus and Tethys. (2) A Thracian ally of the Trojans, of whom the oracle declared that if his white horses should drink the waters of the Xanthus or feed on the grass of the plain of Troy, the city would not be taken. As soon as Rhesus in his journey reached the Trojan territory, he was surprised and slain in his camp by Odysseus and Diomedes, and his horses were carried off.

RHESUS (from Lat. *Rhesus*, Gk. Ῥῆσος, name of a river in the Troad, another in Bithynia, a King of Thrace, etc.). A small brown monkey (*Macacus rhesus*), common all over India. It is known as the Bengal monkey, or 'bandar' of the Hindus. It moves about in large bands, ascending to the height of 8500 feet in the Himalayas, and is often protected and fed in the neighborhood of temples, by the Hindu priests, although not universally regarded as sacred. This monkey is one of those most familiar in menageries, where it may be recognized by the straightness of its moderately long hair, by the tapering tail, about one-half the length of the head and body, and by the nakedness of the buttocks, for some distance around the callosities. This is the monkey commonly carried about by Hindu jugglers, who teach it amusing tricks; and many stories are told of its superior intelligence. Compare MACAQUE.

RHETORIC (Lat. *rhetorica*, from Gk. ῥητορική, *rhētorikē*, rhetorical art, fem. sg. of ῥητορικός, *rhētorikos*, relating to an orator, from ῥήτωρ, *rhētōr*, orator; connected with ἐρεῖν, *erein*, to say, and ultimately with Eng. *word*). Taken broadly and philosophically, the science and art of communication in language, including all the processes and technical means by which, through language, the members of a community react one upon another. The general tendency of modern textbooks has been to broaden the scope of rhetoric to include everything pertaining to the art of composition, and even to annex adjoining territories, such as poetics, and stylistic and literary criticism. But although rhetoricians are still far from agreement, the goal of recent thought is fairly well expressed in the definition here given.

Regarded from the scientific point of view, rhetoric properly belongs to that branch of knowledge which is concerned with the relations of men in society. The place and rationale of the science may be indicated as follows. In every community a great variety of activities go on simultaneously. One important group of

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these activities consists of all the processes by which, through a variety of media, men express themselves and convey their thoughts and feelings to their fellows. This group may be called the expressive-communicative group of activities. It includes not only the more primitive modes of thought-conveyance, such as gesture, grimace, picture writing, the histrionic dance, and the like, but also the most highly elaborated modes, such as the arts of architecture, sculpture, music, painting, and oral and written speech. This large class may be subdivided in two ways: (1) according to the medium employed in the process of thought-conveyance, and (2) accordingly as the emphasis is thrown upon the individual or the social phase of the process. The first method of classification leads to the differentiation of the several arts; the second to the distinction of processes mainly self-expressive from processes mainly communicative. The subject matter of rhetoric is thus seen to be distinguished from that of allied sciences by the fact (1) that its medium is language, and (2) that the emphasis is thrown upon the phase of communication; that is, upon prose. The proper subject matter of the science may therefore be summed up in the phrase 'Expression in language for *communication's* sake,' just as the proper subject matter of poetics may be summed up in the phrase 'Communication in language for *expression's* sake.' But it should not be forgotten that although rhetoric is the science of communication, it is still concerned to a large extent with questions of expression.

If we regard rhetoric as it has been outlined above, its underlying problem is seen to concern the reciprocal speech relations of the individual and the community. Of this problem there are three principal phases, as follows:

I. *Psychological problems* relating (1) to the nature of the writing or speaking man, (2) to the mental activities involved in the process of composing. Here arise questions regarding (a) the nature and genesis of expression, (b) the characteristics of genius, (c) the acquirement and cultivation of the speech habit, and (d) the factors operating in the experience of the individual to turn his self-expression into the communicative channel. The first of these questions has been treated at some length by Darwin in his *Expression of the Emotions*, and by those who have sought to controvert him; the second, by Lombroso and others; and the third, by many recent psychologists. The fourth is as yet practically unexplored. It is obvious, however, to touch upon it briefly, that every successful writer or speaker is on one side receptive, on the other productive. As receptive he is a product of heredity and of the social environment. Through imitation of his fellows, this native impulse results in the acquirement of the resources of language, and the individual thus develops a writing or speaking personality. On the other hand, as productive, the writer exhibits the faculties of invention and social imagination. He creates by combining old ideas in new ways that suit better the needs of his contemporaries. He has a sympathetic imagination, which enables him to penetrate into the minds of his hearers, to read their desires, and to conceive how his words will act upon them. His expression is thus, in a sense, drawn from him, and shaped, by his keen realization of the needs of his hearers. He produces in order to satisfy these needs.

II. *Social problems*, relating to the dynamic effect of speech upon the community of hearers or readers. The assumption which underlies discussion of the subject from this point of view is that language is preëminently the social bond —the connective tissue by which society is held together in organized forms. The main questions relate (1) to the typical modes of response on the part of individuals and groups of individuals in the community, (2) to the formation of social or public opinion. Diall, *Psychology of the Aggregate Mind of an Audience*, has endeavored to show that the minds of an assemblage listening to a powerful speaker undergo a curious process called 'fusion,' by which the members of the audience, losing their individual traits, are reduced, as it were, to a single individual, whose characteristics are those of an impulsive youth of twenty, imbued in general with high ideals, but lacking in reasoning power and will. But it is important here to distinguish, as Tarde has done (*L'Opinion et la foule*), between a 'crowd' and a 'public,' the associative principle of the former being physical, of the latter psychical. The rise of printing, which enables communication of the same matter simultaneously to persons widely separated in space, tends to the formation of a true public, which is not 'fused,' but can freely exercise both reason and volition.

III. *Formal problems*, relating to the medium of communication, namely, language, or, more precisely, discourse, that is, language in organized form. The main problems concern: (1) the nature and origin of discourse; (2) the peculiar function of discourse as (a) on one side, the expression of the individual, and (b) on the other side, the means of social interchange; (3) the structure or morphology of discourse in (a) its minuter forms (words, phrases, sentences, paragraphs, figures, rhythms), (b) its larger forms (whole compositions), (c) its typical modes (description, narrative, exposition, argument, persuasion); and (4) the typical methods of distribution (books, newspapers, conversation, etc.). The formal aspect of rhetoric has been developed in considerable detail in ancient and modern treatises, but has not been consistently unified or properly connected with the other two phases. It has been the practice of rhetoricians to make certain postulates of a formal character, such as the principle of unity in variety, of symmetry, or of purity, and upon these, by a process of deductive reasoning, to build a structure of theory. Of all the principles that have been advanced to explain the structural side of rhetoric, that of organic unity is perhaps most fundamental, and from it may be derived all of the usual rhetorical qualities. But the truth is that all such principles are derivative, not primary. A truly scientific exposition would demonstrate that the peculiar forms and qualities of any piece of discourse are the natural outcome of the interaction of the individual and society in the process of communication. An oration, for example, is the product of two forces, (1) the impulse of the individual to a certain kind of self-expression, and (2) the demand of the social mind for a certain kind of communication. The oration is the meeting point of these two forces. It is the path of least resistance traced by the language of the orator in adapt-

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ing his utterance to the hearers' needs and desires.

RHETORIC, Figures of. A term popularly applied to a large and heterogeneous class of language-forms, all characterized by the fact that they are deviations from what is plain, literal, and straightforward. From ancient times figures have been regarded by rhetoricians as 'embellishments' of speech; that is, as conscious devices and ornaments. Figures are commonly said to give life, strength, and beauty to style, but it would perhaps be truer to say that they have the power of arousing in the reader or hearer the same emotional and imaginative processes which gave birth to them in the mind of the writer.

Since the conceivable modes of departure from literal statement are almost infinite in number, it is obvious that an exhaustive enumeration of figures is difficult, and a classification of them well nigh impossible. The ancients, for whom the subject had a peculiar fascination, enumerated as many as 250 distinct species, and although modern writers, generally speaking, have been less prodigal in their invention, the *Arte of Poesie*, attributed to Puttenham (1589), names and defines 107. In recent text-books the tendency is to limit the number to 10 or 12. The important figures are as follows:

I. Figures of Imagery. These are figures which arouse concrete images in the mind of the hearer. (a) *Metaphor* is a form of expression in which one object is made to appear under the image of another which it resembles in some particular. Thus in the sentence, "The ice makes daggers at the sharpen'd eaves," icicles are presented to us under the image of daggers, which resemble them in shape and color. Sometimes a metaphor contains two images which fail to blend, as in "With swift rapier-thrusts of irony, the prosecuting attorney applied the thumbscrews to the unwilling witness." Such figurative jumbles are called mixed metaphors. Akin to the metaphor, though distinct as being a legitimate development of semasiology (q.v.), is catachresis, in which a word is extended in meaning beyond its strict sense, as 'a silver drinking-horn.' (b) An extended metaphor in narrative form is called *allegory*. Bunyan's *Pilgrim's Progress* is a famous example. A short, pointed allegory in which animals are represented as speaking and acting is called a fable. The brief allegories of the Bible are known as parables. (c) *Simile* differs from metaphor in that the resemblance between object and image which is assumed in metaphor is in the simile expressly stated by means of the word *like* or *as*. Thus "His face was a withered moon" is metaphor, but "All his face was white And colorless, and like the wither'd moon, Smote by the fresh beam of the springing east," is simile. (d) *Synecdoche* is a kind of metaphor in which the image is related to the object as a part to the whole, as the whole to a part, as genus to species, etc. Thus in "All hands on deck," *hands* is used for *men*. (e) In *metonymy* the image is an accompaniment of the object; that is, what contains it, stands for it, as, "The poorest man may in his cottage bid defiance to all the force of the Crown," *the Crown* standing for *the King*. Metonymy and synecdoche are, however, so nearly alike that the distinction is hardly worth preserving.

II. Figures of Arrangement. In these figures, words, phrases, clauses, or sentences are disposed in some peculiar and striking way to correspond to peculiar sequences of thought. (a) *Climax* consists in the arrangement of words, clauses, or sentences in the order of their importance, the least forcible coming first and the others rising in importance until the last; as in this example: "It is an outrage to bind a Roman citizen; it is a crime to scourge him; it is almost parricide to kill him; but to crucify him—what shall I say of this?" (b) *Antithesis* occurs when corresponding parts of a sentence are so juxtaposed as to give force to contrasting ideas; as, "To err is human, to forgive divine." Both climax and antithesis may appear also in the arrangement of the larger units of composition, as paragraphs and complete essays, as well as in the smaller units of words, clauses, and sentences.

III. Figures of Contradiction. In these figures there is an apparent contradiction between the form of expression and the idea to be expressed. (a) In *irony* the speaker's words seem to convey one meaning, but in reality convey just the contrary, the real meaning being suggested by the tone of the voice or the implication of the words. (b) *Epigram* is a brief, pointed sentence. Talleyrand's saying, "Language was given to man to conceal his thoughts," is a good example of epigram. (c) In *hyperbole* an object is greatly exaggerated in size or importance, for impression or humorous effect; as, "Swifter than the winds and the wings of the lightning." Hyperbole may also be looked upon as a kind of metaphor. Of the figures defined above, four—metaphor, metonymy, synecdoche, and irony—are often called 'tropes,' because in them a word is turned from its ordinary meaning or application. But the word is also applied to a figure of any kind expressed in a single word.

Among the figures which are less easy to classify may be mentioned the following: *Apophasis, paraleipsis*, or *omission* is the pretended omission or passing over of what one is really mentioning. *Apostrophe* is a turning aside to address an inanimate object, or a person not present. *Asyndeton* consists in the omission of connectives, as "I came, I saw, I conquered." *Epanorthosis* is an effective correction of something which has just been said, as "His fault—perhaps I should rather say his crime." *Epiplexis* is a figure in which a person seeks to move or persuade by means of gentle upbraiding. *Epiploce* is a climax consisting of several clauses so framed that the last part of one clause is repeated as the beginning of the next, as "He not only spared his enemies, but continued them in employment; not only continued them, but even advanced them." *Epistrophe* is a figure by which successive clauses or sentences end with the same emphatic word or phrase, as "Are they Hebrews? So am I. Are they Israelites? So am I. Are they the seed of Abraham? So am I." *Euphemism* is the use of mild, softened language on unpleasant subjects, for the purpose of avoiding the directness of plain speech. *Interrogation* is the asking of questions, not to gain information, but to assert more emphatically the opposite of what is asked. *Litotes* is a figure in which the author denies one thing instead of directly affirming the opposite. *Onomatopœia* is the use of a word, phrase, or clause to imitate

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the sound of the thing signified as 'rat-tat-tat,' 'bow-wow.' *Personification* or *prosopopœia* is the representation of inanimate objects as living beings, as "Necessity is the mother of invention."

RHETT, rĕt, ROBERT BARNWELL (1800-76). An American politician, born at Beaufort, S. C. His name was originally Smith, but after entering public life he changed it for that of a prominent colonial ancestor. He received a liberal education, studied law, and in 1826 became a member of the State Legislature. In 1832 he was elected Attorney-General of the State, and during the Nullification agitation attracted wide attention by his radical advocacy of the theory of State's rights, in which he outstripped Calhoun himself. In the fall of 1836 he was elected as a Democrat to Congress, sitting by reëlection until 1849, and taking a leading part in the acrimonious slavery debates. In 1850 he was elected United States Senator to fill the vacancy caused by the death of John C. Calhoun and took his seat January 6, 1851. He at once took the most extreme position in regard to slavery, and stoutly opposed all compromises as only temporary expedients to put off for a short time the inevitable secession. In the heated campaign of the year 1852 he advocated the immediate withdrawal of South Carolina from the Union without consultation with other Southern States. The Union candidates were generally successful at the ensuing election. Rhett took the defeat as a personal rebuke, resigned his seat in the Senate, and retired to his plantation. In the Charleston *Mercury*, in which he purchased a controlling interest, he continued to advocate his extreme views, and in 1860 again came into prominence as one of the most radical members of the South Carolina convention which adopted the ordinance of secession, and was the author of its address to the people. In the Montgomery convention which met to organize a provisional government for the seceding States he was one of the most active delegates, and was chairman of the committee which reported the Confederate Constitution. Subsequently he was elected a member of the Lower House of the Confederate Congress. After the war he settled in Louisiana.

RHEUMATISM (Lat. *rheumatismus*, from Gk. *ῥευματισμός*, liability to rheum, a flux, from *ῥευματίζεσθαι*, *rheumatizesthai*, to have a flux, from *ῥεῦμα*, *rheuma*, flux, flow, from *ῥεῖν*, *rhein*, Skt. *sru*, to flow). An acute or chronic disease characterized by painful local inflammations. It may be divided for convenience of description into the articular (that involving the joints) and the muscular varieties. Either form may be acute or chronic. Acute articular rheumatism is a constitutional disease, not contagious, and characterized by fever, pain, and inflammation in and around the joints and a tendency to involvement of the pericardium and endocardium. The joints are apt to be attacked in succession. Rheumatism is a disease of moist and temperate climates, and the acute articular form usually occurs in young adults, although children are not by any means exempt.

The close analogy that exists between acute rheumatism and certain of the infectious diseases has led many investigators to believe that it is due to a specific germ, in spite of the fact that no microörganism has as yet been found constantly associated with the disease. A more generally accepted theory is that it is due to some morbid material produced in the system as a result of defective metabolism. It has been suggested that this material is lactic acid. Others believe that the disease is due essentially to some nervous disturbance. The immediate exciting causes are exposure to wet and cold, or a chilling of the body such as occurs from sitting in a draught. The symptoms often begin quite suddenly, at night, with pain and stiffness in the joints, with nausea and vomiting, followed by all the manifestations of a high fever. The latter may reach as high as 108° F. in severe cases. The pulse is comparatively slow, there is great thirst, profuse acid sweats, and the urine becomes high-colored, scanty, and abnormally acid. The affected joints are painful and tender, hot, red, and swollen. Swelling is apt to be most apparent in joints scantily covered with muscle, viz. the knee, wrist, elbow, ankle, and the joints of the hands and feet. One or more joints may be affected, and the disease travels from joint to joint. Acute rheumatism is distinguished by the number and severity of its complications. These affect principally the serous membranes of the body. Pericarditis (q.v.) is a common complication. Endocarditis (q.v.), which often results in chronic cardiac trouble, is also of frequent occurrence. Pleurisy (q.v.) with effusion is often seen in association with pericarditis. Less often, bronchitis, pneumonia, and inflammation of the cerebral arteries occur. In itself, acute articular rheumatism is not a fatal disease, and the majority of cases recover within a week or ten days. Relapses, however, often occur, and weeks or months may elapse before entire cure is attained.

Chronic articular rheumatism may result from an acute attack, but most frequently it arises independently in persons of advanced middle age. The causative elements are similar to those of the acute form, but the onset is insidious. It is most apt to attack those whose occupation exposes them to cold and damp. The joints gradually become painful and stiff, and the condition varies from time to time. It is worse in the morning and is aggravated by damp weather. Late in the disease the joints become greatly distorted and ankylosis may supervene.

Muscular rheumatism is an affection of the voluntary muscles and of the fasciæ and periosteum to which they are attached. It is inflammatory in character and may be acute or chronic. In contrast to the articular variety, muscular rheumatism is never complicated by cardiac disease. It is a malady of adult life; is almost always due to cold and damp; and one attack predisposes to another. The first attack is generally acute. The onset is sudden with pain in the affected muscles, with slight tenderness, and considerable stiffness and difficulty of movement, by which the pain is increased. Fever is absent or slight. The acute attack lasts about a week. When the disease reaches the chronic stage the attacks return frequently and finally become constant and aggravated when the weather is damp. This form of rheumatism is prone to involve particular groups of muscles, and different names have been applied to it according to its location. When situated in the occipito-frontal muscles it is called *cephalodynia* and may be mistaken for neuralgia of the trifacial or occipital nerves. The eye or jaw muscles may be affected, giving rise to pain when these parts are used. *Torticollis* (wry-

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neck) is an affection of the muscles of the side of the neck usually rheumatic. It is generally limited to one side, toward which the head is twisted. *Cervicodynia*, involving the muscles of the back of the neck, is comparatively rare. *Pleurodynia* is applied to a rheumatic affection of the thoracic muscles. Pain is excited by forced breathing, coughing, or sneezing. It is often mistaken for pleurisy or intercostal neuralgia, which it closely simulates. A very common form of muscular rheumatism is *lumbago* (q.v.).

For the efficient treatment of even mild cases of acute rheumatism rest in bed is imperative; indeed, in severe cases the patient cannot do otherwise than lie still. Local measures to relieve pain consist in wrapping the affected joints in cotton wool, upon which some anodyne liniment, such as belladonna or opium, or oil of wintergreen, may be sprinkled freely. The drugs now used internally consist of salicylic acid and its derivatives, with acetanilid, antipyrin, or morphine to relieve severe pain. It is agreed, however, among the best authorities that no medicine has much control over the course or duration of the disease. The diet should consist of milk chiefly, either alone or diluted with barley water, lime water, or vichy. Lemonade is beneficial as a drink. In acute muscular rheumatism hot poultices applied to the parts affected will afford great relief. The treatment of lumbago, wryneck, pleurodynia, etc., is dealt with fully under those titles. Chronic rheumatism is best treated locally by friction with stimulating liniments. Much relief is obtained both from pain and loss of function by exposure of the joints to superheated air in a specially devised apparatus. Electricity and hydrotherapy (q.v.) are useful in improving the circulation and nutrition of the joints. Internally the most constantly employed drug is potassium iodide. The alkaline waters may be taken habitually. The greatest attention must be paid to the general health, and good food, warm clothing, and tonics, particularly cod-liver oil, iron, arsenic, and strychnine, are necessary to prevent relapses and recruit the strength.

RHEYDT, rīt, or **RHEIDT**. A town in the Rhine Province, Prussia, on the Niers, 28 miles northwest of Cologne (Map: Prussia, B 3). It has a handsome new town hall, statues of William I. and of Bismarck, and a fine Hohenzollern fountain in the market-place. It manufactures silks, woolens, velvets, machinery, cigars, paper, etc., and has dye-works. Rheydt received municipal privileges in 1856. Population (commune), in 1890, 26,830; in 1900, 34,034.

RHIN, răn, Bas- (Fr., Lower Rhine). A former frontier department of France, corresponding nearly to the present German administrative district of Lower Alsace in the Imperial territory of Alsace-Lorraine (q.v.). It was ceded to Germany in 1871 by the Treaty of Frankfort.

RHIN, Haut- (Fr., Upper Rhine). A former frontier department in the east of France, with the exception of the Territory of Belfort (q.v.), since 1871 comprehended within the German District of Upper Alsace. The Territory of Belfort is often called Haut-Rhine. See Alsace-Lorraine.

RHIND PAPYRUS. A mathematical manuscript written by an Egyptian scribe, Ahmes, who lived before B.C. 1700. It is now deposited in the British Museum. See Ahmes; Algebra; Eisenlohr.

RHINE. The principal river of Western Europe. It rises in Southern Switzerland, and flows in a general northwest direction through Western Germany and Holland, emptying into the North Sea after a course of 760 miles (Map: Germany, B 3). The Rhine proper is formed in the Canton of Grisons, Eastern Switzerland, by two main headstreams, the Vorderrhein and the Hinterrhein. The former is the larger of the two. It rises on the north slope of the Saint Gotthard group within two miles of the source of the Rhone, at an altitude of 7690 feet, and passes northeast along the base of the Glarner Alps till it meets the Hinterrhein coming from the south from the glaciers of the Rheinwaldhorn. The combined stream, swelled by numerous mountain torrents to a width of 45 yards, flows northward, separating Switzerland from Liechtenstein and Austria, and enters the Lake of Constance. It leaves the main body of the lake at the town of Constance, and passes into the Unter See (Lower Lake) a short distance farther on. The Rhine now flows westward, becomes narrow and very rapid, finally (below Schaffhausen) plunging over a rocky precipice 70 feet high. Another and smaller fall is encountered at Zurzach, below which the Rhine receives its first great tributary, the Aar, which brings to it the waters of Northwestern Switzerland. The river bed continues for some distance to be narrow and rocky with several rapids. It continues its westward course to Basel, where it makes a sharp turn to the north and enters wholly into German territory, having formed the boundary between Germany and Switzerland from the Falls of Schaffhausen to this point. At Basel the river is 190 yards wide and is henceforth navigable without obstructions. It now flows on the boundary between Baden and Alsace through a wide and level flood-plain bordered by the Vosges Mountains on the west and the precipitous and romantic Black Forest on the east. In this valley it passes Strassburg, just below which city it receives the Ill, which drains Upper Alsace. After forming for about 50 miles the boundary between Baden and the Palatinate it is joined at Mannheim by the Neckar from the east. It continues its course northward through Hesse, passing the town of Worms, and at Mainz receives the Main, its principal affluent from the right. At Mainz the river makes a short turn to the west, and then at Bingen an abrupt turn to the northwest. It now enters upon the most romantic and celebrated part of its course, reaching from Bingen to Bonn, a distance of about 80 miles, all through Prussian territory. Here the river is much narrowed and winds between steep mountains rising often from the water's edge. The heights are crowned by the famous ruined castles and the slopes are covered with vineyards, this stretch being well known for the Rhenish wines. The chief town on the Rhine in this part of the course is Coblenz, at the confluence of the Moselle, the largest tributary from the left. After passing the Siebengebirge at Bonn the river and its valley again widen out, and from Cologne to its mouth the Rhine flows through a low, level country, turning gradually westward as it enters Holland. The largest city on its banks below Cologne is Düsseldorf. A short distance below

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Düsseldorf the Rhine is joined by the Ruhr from the right, and a little farther down it receives the Lippe, also from the right. Shortly after passing the Dutch boundary it divides into two arms, the southern and larger of which, known as the Waal, flows into the great delta of Southern Holland, where it merges with the Meuse and the Scheldt. The northern arm divides again at Arnhem, the Yssel coursing north into the Zuyder Zee, and the other arm flowing westward, parallel with the Waal. This latter arm, called Lek (Leck) below Wijk, pours its waters into the North Sea through the Nieuwe (New) Maas. At Wijk a narrow arm, which at first bears the name of the Crooked Rhine, branches out northward and flows past Utrecht, below which it is known as the Old Rhine. At Utrecht the Vecht branches out from this arm and flows into the Zuyder Zee. The Old Rhine, which has barely the dimensions of a river, flows past Leyden, and discharges into the North Sea, a few miles north of Scheveningen.

Commercially the Rhine is probably the most important river of Europe, its valley being densely populated, with numerous important industrial cities, especially along its middle course. Canals connect the Rhine with the Meuse, the Seine, the Saône, the Danube, and the Ems. The Rhine-Rhone Canal follows the course of the river from Strassburg almost to Basel, and is generally used instead of the river, whose current here is very swift. The shipping at the principal ports on the Rhine amounts to nearly 8,000,000 tons annually, and the river is visited every year by more than 1,000,000 tourists. The legends of the Rhine figure prominently in German folk literature.

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RHINE, CONFEDERATION OF THE. See CONFEDERATION OF THE RHINE.

RHINE-HESSE. A province of the Grand Duchy of Hesse (q.v.), Germany.

RHINELANDER. A city and the county-seat of Oneida County, Wis., 103 miles northwest of Green Bay, on the Wisconsin River, at the Pelican Rapids, which afford large water power, and on the Chicago and Northwestern and the Minneapolis, Saint Paul and Sault Ste. Marie railroads (Map: Wisconsin, D 3). It is the centre of a region noted for its extensive lumber output, and has several saw and planing mills, a refrigerator factory, a veneer factory, boiler and iron works, etc. Population, in 1890, 2658; in 1900, 4998.

RHINE PROVINCE (Ger. *Rheinprovinz*, or *Rheinland*), or RHENISH PRUSSIA. The most densely populated province of Prussia, bounded by the Netherlands on the north, Westphalia and Hesse-Nassau on the east, Lorraine on the south, and Luxemburg, Belgium, and the Netherlands on the west (Map: Prussia, B 3). It covers an area of 10,423 square miles. About 43 per cent. of the total area is under tillage. The chief agricultural products are rye, wheat, barley, oats, and potatoes. There are extensive vineyards along the Rhine and Moselle, and wine is exported on a large scale. The large coal fields to which the province mainly owes its industrial development are situated chiefly along the Ruhr and the Saar. The province produces annually upward of 25,000,000 tons. Iron, zinc, lead, copper, quicksilver, and manganese are mined. Salt, sulphur, and several kinds of stone and useful earth are also produced in considerable quantities. The production of different metal articles from locomotives and guns to needles and small tools ranks first among the manufacturing industries of the province. The textile branches have also attained a high state of development. Some of the textiles, such as the woolen fabrics of Aix-la-Chapelle or the silks of Krefeld, are foremost in the world. The Rhine Province has also extensive glass works, paper mills, chemical works, and tanneries, besides a number of sugar refineries, distilleries, and breweries.

The extensive trade of the province is greatly promoted by the excellent transportation facilities, especially the railways. There are about 2400 miles of railways. The chief commercial centres of the province are Cologne, Düsseldorf, Aix-la-Chapelle, Coblenz, and Duisburg. It is divided into the five districts of Coblenz, Düsseldorf, Cologne, Treves, and Aix-la-Chapelle. The capital is Coblenz. The province is represented in the Prussian Landtag by 28 members in the upper and 62 delegates in the lower chamber. It returns 35 members to the German Reichstag. The population of the Rhine Province more than trebled during the nineteenth century. In 1819 it was only about 1,871,000; in 1900 it was 5,759,000, showing an increase of 12.8 per cent. since 1895. Over 70 per cent. is Roman Catholic.

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RHINITIS (Neo-Lat., from Gk. *ῥίς*, *rhis*, nose). Inflammatory disease of the mucous membrane of the nose; nasal catarrh. Low temperature, air in motion and moisture, or mechanical irritants, together with certain bacilli combine to cause a hyperæmic swelling with first a dryness, then an increased production of mucus and a transudation of serum into the blood vessels. Emigration of leucocytes may follow (see INFLAMMATION) and desquamation of epithelium from the mucous membrane may occur. The disease is commonly known as 'cold in the head.' The mucous membrane may remain thickened permanently or may become atrophic, so that an ordinary attack of rhinitis may terminate in three or four days, or may pass into a chronic condition, continuing for months. Some cases are caused by reflex irritation, the primary seat of trouble being in over-stimulated sexual organs. In the treatment of acute rhinitis preparations of ammonium, belladonna, potassium citrate, ipecacuanha, camphor, carbolic acid, and saline cathartics are used, as well as alkaline or astringent topical applications. Similar treatment is used in cases of chronic rhinitis, besides surgical

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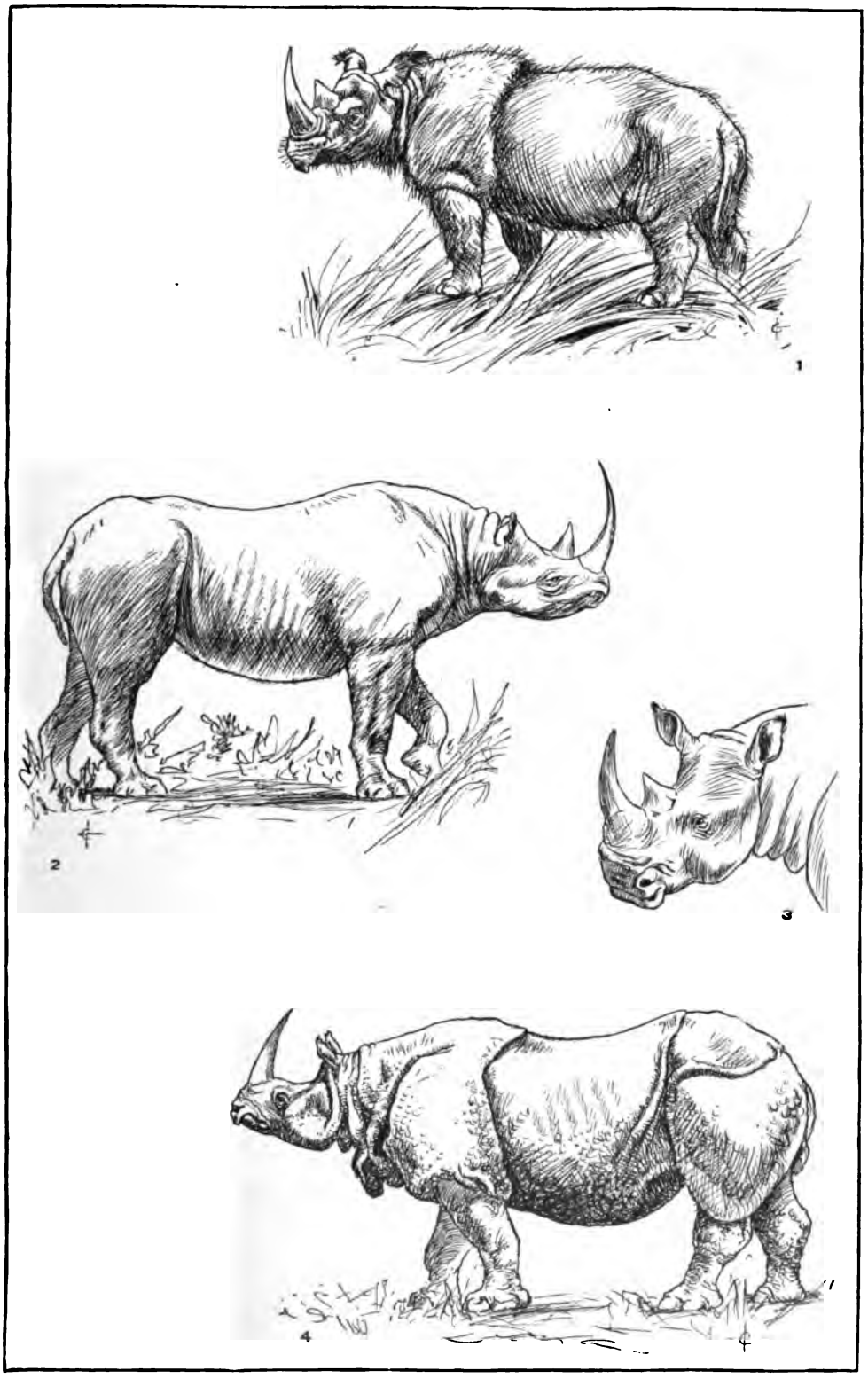
RHINOCEROSES



1. HAIRY RHINOCEROS (Rhinoceros lasiotis).
2. AFRICAN RHINOCEROS (Rhinoceros bicornis).
3. AFRICAN SQUARE-LIPPED RHINOCEROS (Rhinoceros simus).
4. INDIAN RHINOCEROS (Rhinoceros unicornis).

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interference in the way of removal of hypertrophic tissue, both mucous membrane and bone, as well as the correction of intra-nasal deformities. Hay fever (q.v.) is sometimes termed 'pruriginous rhinitis.' *Rhinitis ulcerosa* is considered under OZENA. For a study of the bacteriology of nasal inflammation, see Howard, in *American Journal of the Medical Sciences*.

RHINOCEROS (Lat. *rhinoceros*, from Gk. *ῥινόκερως*, *rhinokerōs*, rhinoceros, nose-horned, from *ῥις*, *rhis*, nose + *κέρως*, *kerōs*, horn). An animal of a family of perissodactyl ungulates (q.v.), the Rhinocerotidæ, closely allied to the tapirs, and containing the largest and most powerful of terrestrial mammals, except the elephants. There are five existing species, all natives of the warm parts of Asia, the Indian Archipelago, and Africa. The form of the rhinoceros is massive and uncouth. The limbs are thick and strong; each foot is terminated by three nearly equal toes, covered with broad, hoof-like nails, with a fourth non-functional toe on the front feet. The tail is small and terminated by a small tuft. The head is large, the muzzle prolonged, ears moderately large, eyes small, and nasal bones combined into an arch for the support of a horn or horns. The upper lip in most species is prolonged, pointed, and prehensile. The incisors are defective in the Asiatic species, and, as well as the canines, wanting altogether in the African species; the molars and premolars are alike and highly effective as grinders. The skin is extremely thick and smooth, but soft and sensitive, although in the Asiatic species it has the appearance of a rigid armor, studded with tubercles and jointed in folds or wrinkles where necessary to permit movement of the head and limbs. The hide is used for making whips, harness, ropes, and so on, and when dried and hardened forms a material for shields capable of resisting spear thrusts and old-fashioned bullets. When properly dried and prepared it has the translucency and mottled appearance of tortoise-shell, and from it are made various ornamental objects by East Indian artificers. The nasal horn or horns are formed of a solid mass of agglutinated bristles which spring from the skin of the nose, but are rooted upon a bony plate surmounting the skeleton of the nose. This horn is not only a powerful weapon, but with it the animal can root up and overturn bushes and small trees whose leaves and roots it seeks to eat.

The Indian rhinoceros (*Rhinoceros Indicus*) formerly ranged over most of the peninsula, but is now restricted almost entirely to the Assam plain, and lives chiefly in grassy jungles. It is the largest known species and sometimes exceeds five feet in height and ten feet in length. The single horn is sometimes two feet long and eighteen inches in circumference at the base. The Javanese or Sondaic rhinoceros (*Rhinoceros Sondaicus*) is a much smaller species, also one-horned, found from Bengal to Java. Its armor has a tessellated appearance, and the female is hornless. The Sumatran or hairy rhinoceros (*Rhinoceros Sumatrensis*) is so distinct that some naturalists have placed it in a separate genus (Cetorhinus). It ranges from Northeastern India to Borneo, has a more hairy coat than the others, and two short blunt horns, one behind the other. A hairy-eared race (var. *lasiotis*) inhabits Assam.

The two species of African rhinoceros differ from the Asiatic ones mainly in the absence of incisor teeth and in the smoother, unfolded skin; and they have been put into a separate genus (Atelodus) by some naturalists. Possibly a third species exists, of which nothing very definite is known. The more familiar and widespread of the African rhinoceroses is the 'common' or 'black' one (*Rhinoceros bicornis*) formerly abundant all over the eastern and south-central parts of the continent, but now become rare and restricted. It is not black, but bluish lead-color, if anything rather lighter than the other species usually called 'white.' This rhinoceros stands 5½ feet at the withers in the case of large males or 'bulls,' and has two horns. The front one, usually much the longer in South African examples, sometimes attains a length of 40 inches, but is always less in northern specimens. The rear horn varies from a mere knob to a length almost equal to its fellow, and is usually straighter and much compressed. The upper lip is pointed, extensible, and prehensile, and this species feeds almost wholly on leaves, twigs, and roots. It frequents bushy and rocky districts rather than open plains. It spends the day in an accustomed lair well hidden from observation, and starts at sunset for a drinking-place along a well-trodden path. Having drunk it will wander about feeding during the night, will drink again at daybreak, and then return to its resting-place. Some hunters regard this rhinoceros as naturally ferocious and vindictive, while others consider it stupid and timid, but subject to sudden panics, in which it is as likely to rush headlong toward the hunter as away from him. At best, however, it is dangerous, and its speed and agility are extraordinary. The other African species, the white, Burchell's or square-mouthed rhinoceros (*Rhinoceros simus*), is larger than the 'bicornis,' the biggest, indeed, of the entire tribe, and differs from the other prominently in having a blunt, squarish muzzle, the upper lip not being at all prehensile. In conformity with this it is a grazing, not a browsing animal.

FOSSIL RHINOCEROSES. The existing species are the lone remnants of a once numerous group that abounded in North America from Eocene to late Miocene time, and in Europe from Eocene to Pliocene time. The fossil and living species may be grouped under three families. The Hyracodontidæ, represented by the genera Hyrachyus and Hyracodon of Eocene and Oligocene time, comprised hornless, lightly built animals adapted for running on the uplands. They show a tendency to reduce the number of functional digits of the feet from five to three and thus to parallel the evolution seen in the horse's hoof. The Amynodontidæ, comprising the American genera Amynodon, Metamynodon, and the European Cadurocotherium, were heavily built, short-bodied animals adapted to more or less aquatic habits of life. The skull was hornless and the eyes were situated high on the head. The upper incisors are reduced and the canine teeth are enlarged to form tusks for use in uprooting water plants. The true rhinoceroses (Rhinocerotidæ) began as light-limbed runners without horns, that lived at the same time as the members of the two preceding families. After the hyracodonts and amynodonts had become extinct the rhinoceroses began to adapt themselves to

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the habits of life of their predecessors and evolved along six different lines of descent. A gigantic animal, Elasmotherium, found in the Pleistocene deposits of Northern Asia, thought to have descended from Aceratherium, attained a length of 15 feet, and had two large horns in tandem and prismatic teeth. The woolly rhinoceros (*Atelodus antiquitatis*) is found fossil in the Pleistocene deposits of England and in the cave deposits of Europe, and its complete carcasses have been obtained from the frozen mud banks of the tundras of Northern Siberia. It was a large two-horned species, with a heavy fur of coarse woolly hair.

BIBLIOGRAPHY. The best general account of the tribe is by Lydekker in *Royal Natural History*, vol. ii. (London, 1896). Consult, also: Blandford, *Fauna of British India: Mammals* (ib., 1888-91); Baker, *Wild Beasts and Their Ways* (ib., 1890); Hornaday, *Two Years in the Jungle* (New York, 1885); Drummond, *Large Game . . . of Southeast Africa* (Edinburgh, 1875); and similar books of naturalists and sportsmen relating to Southern Asia and Africa; Osborn, "Phylogeny of the Rhinoceroses of Europe," *Bulletin of American Museum of Natural History*, vol. xiii. (New York, 1900); id., "The Extinct Rhinoceroses," *Memoirs of the American Museum of Natural History*, vol. i., part iii. (ib., 1898). See Colored Plate of PACHYDERMS.

RHINOCEROS BEETLE. A name in the South for a large scarabæid beetle (*Dynastes tityus*). It is most abundant in the southern Atlantic States, but extends west to New Mexico and north to Cape May and southern Pennsylvania. It is a large beetle, nearly 2½ inches in length, and is stout. The male has two long

A MALE RHINOCEROS BEETLE.

horns, one extending forward from the head and the other from the thorax, from which fact it derives its popular name. The female resembles the male, but lacks the horns. It is pale bluish gray in color and the wing-veins are marked with darker irregular spots. The egg is an eighth of an inch in length and is laid in rich earth or decaying trunks of old trees of several varieties. The insect in all stages has a very strong and disagreeable odor.

RHINOCEROS-BIRD. (1) An oxpecker or buffalo-bird (qq.v.) which settles upon the backs of rhinoceroses. (2) A hornbill.

RHINOCEROS HORNBILL. See HORNBILL.

RHINODERMA (Neo-Lat., from Gk. *ῥίς, rhis*, nose + *δέρμα, derma*, skin). A small frog (*Rhinoderma Darwini*) of Chile, remarkable for its bell-like voice, and for the fact that the internal vocal sacs in the throat of the male are converted into nests for the eggs, which hatch there, whereupon the sacs become nurseries for the 5-15 tadpoles until they reach maturity. The process is not wholly known, but has been studied by Espada, an outline of whose investigations is given in English by Gadow, *Amphibia and Reptiles* (London, 1901).

RHINOPLASTIC OPERATION (from Gk. *ῥίς, rhis*, nose + *πλάσσειν, plassein*, to mold). When a portion or the whole of the nose has been destroyed by accident or disease the deficiency may be restored by a transplantation of skin from an adjoining healthy part. After paring away any remains of the old nose, a flap of skin of the required shape is carefully dissected from the forehead until it hangs by a narrow strip or pedicle between the eyebrows. Then after all bleeding is stopped the flap is twisted on itself so that its skin surface remains out, while its base is brought down in position to correspond to the original base of the nose. The edges of the flap are then sutured accurately to the denuded edges of the former membrane, spaces being left on either side of the lower end of the flap for the nostrils. As practiced at the present time the operation has received two important modifications: The first consists in the use of a permanent frame of gold or aluminum or platinum, which is fastened into the bony framework surrounding the nasal apperture and which gives shape and profile to the nose; the second consists in the employment of skin-grafts to cover the unsightly area in the forehead and prevent the deforming cicatrix that would otherwise result. See AUTOPLASTY; SKIN-GRAFTING.

RHINS, rĭn, JULES LÉON DUTREUIL DE (1846-94). A French geographer and explorer, born at Saint Etienne. He took part as a midshipman of naval volunteers in the expedition to Mexico and was an ensign during the Franco-Prussian War. From 1871 to 1876 he was captain of a foreign-going ship, in 1876-77 commanded the *Scorpion* of the King of Annam's navy, and in 1882 was Egyptian correspondent of the *Temps*. From 1891 to 1894 he explored Chinese Turkestan (Eastern Turkestan), and the most inaccessible and least-known regions of Northern and Western Tibet. He was murdered by natives at a small town of Eastern Tibet. His publications include *Le royaume d'Annam* (1879), *Carte de l'Indo-China orientale* (1881), *Levé du cours de l'Ogooné* (1884), and *L'Asie centrale* (1889). The results of his last journey were edited by his assistant, Grenard, *Mission scientifique dans la Haute-Asie* (3 vols., 1897-98).

RHINTHON, rĭn'thŏn (Lat., from Gk. *Ῥίνθων*). A Greek comic poet of Tarentum who lived about B.C. 300. He was the first to develop in a written form and to introduce into Greek literature the so-called Hilarotragœdia (*Ἱλαροτραγῳδία*), a species of burlesque tragedy in which the tragic myths were treated in the spirit and style of comedy. He is frequently quoted by Cicero and Varro, and by Athenæus, Hesychius, and other Greek writers, but of his 38 dramas only insignificant fragments are extant. Consult Völker, *Rhinthonis Fragmenta* (Halle, 1887).

RHIZOCARPEÆ. See PALEOBOTANY.

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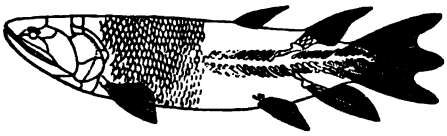
RHIZ'OCEPH'ALA (Neo-Lat. nom. pl., Gk. ῥιζοκέφαλος, *rhizokephalos*, having the flower growing immediately from the root, from ῥίζα, *rhiza*, root + κεφαλή, *kephalē*, head). An order of most degraded cirripeds, the root-barnacles, especially of the genera Sacculina and Peltogaster. The few forms known are parasitic on the abdomens of various crabs.

RHIZ'ODON'TIDÆ (Neo-Lat. nom. pl., from Gk. ῥίζα, *rhiza*, root + ὀδούς, *odous*, tooth). A family of carnivorous Paleozoic fishes of the crossopterygian suborder Rhipidistia, in which the median fins are always more or less subdivided by a process of concentration analogous to that prevalent among dipnoans. The notochord was persistent, and the jaws bore many peculiar teeth. These teeth were highly complicated in

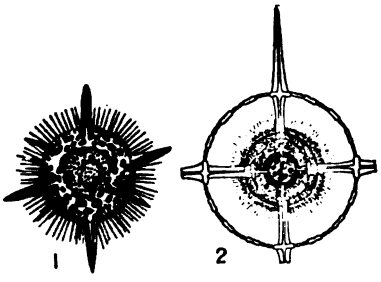


EUSTHENOPTERON FOORDI.

the Holoptychidæ, less so in the Rhizodontidæ, with a larger central cavity. A well-known example, found in an unusually good state of preservation, is *Eusthenopteron Foordi*, herewith figured, which abounds in the Devonian rocks of Quebec, and whose pectoral fin has only one stout basal cartilage—an 'archipterygium.' All were small fishes. Consult Woodward, *Vertebrate Paleontology* (Cambridge, 1898).

RHIZOIDS (from Gk. ῥιζώδης, *rhizōdēs*, root-like). Colorless, hair-like structures developed by liverworts, certain algæ, mosses, and fungi (toadstools and molds). Their function is to anchor the plant in favorable situations and in some cases perhaps to absorb water. The ferns have rhizoids only in connection with the very small prostrate sexual plant (gametophyte, q.v.).

RHIZOP'ODA (Neo-Lat. nom. pl., from Gk. ῥίζα, *rhiza*, root + πούς, *pous*, foot). The first and lowest class of Protozoa (q.v.); a large assemblage of varying forms agreeing in the possession of projections of the body-protoplasm called 'pseudopodia.' These pseudopodia are used as organs of locomotion and also for ob-



1. A radiolarian, showing the interior; 2, cross-section of the same through the processes.

taining food. They may be of very irregular and constantly changing shape or comparatively rigid, independent of each other, or forming a very complex network. The protoplasm or 'sarcode' of a rhizopod consists of an outer layer called 'ectosarc,' which is thin, transparent, and homogeneous, and an inner portion called 'endosarc,' which is granular and more opaque. Most of the numerous species are spherical with radiating pseudopodia, but the lowest forms have no constant shape. Most rhizopods are provided with some sort of shell, but the lowest forms have no such covering. The simplest shells are those made up of particles of dirt or foreign material of some sort, united together by some secretion of the ectosarc; in other cases the shell is formed of a horny material called 'acanthin' or of carbonate of lime or silica, often in a very remarkable and elaborate pattern. Generally rhizopods are freely moving animals, but some are attached in adult life by stalks. The individuals are usually distinct, but colonial rhizopods are known, and such colonies are sometimes half an inch across.

The only internal organs of the Rhizopoda are the 'vacuoles,' those which contain more or less digested food and those which contain the waste matter or excreta of the body. The latter are the larger and more conspicuous, and, owing to the sudden collapse when the excreta are thrown out of the body, are known as 'contractile' vacuoles. Reproduction takes place by simple budding or fission, the two processes differing only in the relative size of the resulting individuals. The formation of spores, however, occurs in many cases, especially after a resting period. Such resting periods occur during unfavorable conditions such as prolonged cold or drought, or when an unusual amount of food has been taken. In most cases during such a resting period the rhizopod surrounds itself with a firm, impervious coat, called a 'cyst.' When the unfavorable conditions cease the sarcode divides up into several minute spores, each of which on the dissolution of the cyst becomes a new individual. The growth of these individuals is rapid when food is abundant. For further information, see Bütschli's *Protozoa* in Bronn's *Klassen und Ordnungen des Thierreichs* (Leipzig, 1887); concerning fresh-water forms, see Leidy *Fresh Water Rhizopods of North America* (Washington, 1879).

RHODE ISLAND. A North Atlantic State of the United States, belonging to the New England group, and situated between latitudes 41° 18′ and 42° 3′ N. and between longitudes 71° 8′ and 71° 53′ W. It is bounded on the north and east by Massachusetts, on the south by the Atlantic Ocean, and on the west by Connecticut. Rhode Island is the smallest in area of the United States. It has an extreme length from north to south of 48 miles, and an extreme width from east to west of 36 miles. Its area is 1250 square miles, of which 1053 square miles, or 673,920 acres, are land surface.

TOPOGRAPHY. The greater part of the State belongs to the eastern Appalachian belt known in the Southern States as the Piedmont Plain. It is rough and hilly, though the general elevation is not great, being less than 600 feet throughout the State, with the exception of a few monadnocks. The highest point is Durfee Hill, near Gloucester, in the northwestern part; its altitude is 805 feet. The western part of the coast-line is bordered by lagoons and marshes, while the eastern part of the State is separated from the main portion by Narragansett Bay, a large, irregular, and branching inlet extending 28 miles inland, with a breadth of from 12 to 3 miles. It incloses a number of islands, the

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largest of which are Aquidneck or Rhode Island, Conanicut, and Prudence Island. Aquidneck, containing the town of Newport, is a beautiful island, 15 miles long and 3 miles wide. It is lined with bold cliffs and fine beaches, and is known as the 'Eden of America.' Nine miles off the coast lies Block Island, a sandy reef inclosing a salt lagoon. The rivers of the State are small. The three largest are the Blackstone and the Pawtuxet in the north, flowing into the upper part of Narragansett Bay, and the Pawcatuck in the south, flowing into the Atlantic Ocean on the Connecticut boundary. All of these are rapid streams, with a number of falls supplying considerable water-power. Like all glaciated areas, the State is studded with numerous small lakes.

CLIMATE AND SOIL. The climate is mild and equable compared with that of the rest of New England. It is influenced chiefly by winds coming from the Gulf Stream. The cold winds striking the eastern coast of New England are almost unfelt here. The mean temperature for January is 36° and for July 76°. The average relative humidity ranges between 80 and 95 per cent. throughout the year. The average rainfall is about 45 inches, ranging in localities from 40 inches in the north to nearly 50 on the coast. The soils are in general coarse, stony, and not well adapted for agriculture, and there is very little alluvial land.

GEOLOGY AND MINERAL RESOURCES. Archæan rocks, chiefly the Montalban gneisses, form the surface of the western half of the State to within three miles of Narragansett Bay. The Narragansett Basin, including the bottom of the bay, its islands and both shores, together with a region running northeast into Massachusetts, forms an interesting patch of Carboniferous deposits. It seems to have been a shallow trough undergoing a continual subsidence as the coal beds and intervening strata were laid down, until the whole deposit attained a thickness of several thousand feet. The basin has since been subjected to folding movements, in which process the strata were crushed and faulted, and the coal converted into graphitic anthracite, and locally almost or wholly into pure graphite. These anthracite beds form the principal mineral deposits of the State, but access to large portions of them is difficult, owing to the proximity of the bay. Along a part of the western edge of the Carboniferous area runs a dike of magnetite iron ore containing considerable deposits, while limestone and granite are the most important of the other mineral resources.

FISHERIES. The fisheries employed in 1898 about 1700 persons. The value of the product for that year was $955,058, to which the oyster catch contributed more than $500,000. Next to oysters the most important fish are scups and squeteagues.

AGRICULTURE. In Rhode Island the number of acres included in farms decreased 17.8 per cent. between 1850 and 1900, the acreage in the latter year being 455,602, or 67.6 per cent. of the total land surface. The number of farms meanwhile remained almost the same, so that the average size decreased from 103 acres in 1850 to 33 in 1900. The improved land in 1900 (41.1 per cent. of the farm acreage) was only a little over one-half as great as the improved area in 1850. In the census year 1900 the most important cereal, corn, represented only 8149 acres, and the next in rank, oats, only 1530 acres. Hay and forage form by far the most important crop, amounting in 1899 to 69,776 acres; but this was a decrease from 94,111 in 1889. Potatoes are relatively important, representing, in 1899, 5817 acres. Sweet corn and other vegetables are grown for the local markets. Much attention is given to the growing of apples, peaches, and pears. The number of peach trees increased over four-fold between 1890 and 1900. Considerably over half the fruit trees are in Providence County. Cranberries, strawberries, and other small fruits are grown.

STOCK-RAISING. Significant increase was made in the number of horses in the last half of the nineteenth century, but there was a very great decrease in the number of dairy cows, sheep, and swine. The following table shows the number of domestic animals on farms:

	1900	1890
Dairy cows	23,660	23,943
Other cattle	12,374	10,834
Horses	11,390	9,864
Mules and asses	43	51
Sheep	6,629	11,400
Swine	11,508	12,055

In 1899 the value of dairy products was $1,923,707. Of this amount 89.2 per cent. was realized from sales, mainly of milk. In the decade of 1890-1900 there was a decrease of 49.4 per cent. in the quantity of butter produced on farms, and an increase of 21.8 per cent. in the quantity of milk.

MANUFACTURES. Since 1870 over 22 per cent. of the total population have been engaged as wage-earners in this line of industry. The number in 1900 was 96,528, of whom 26,984 were women, and 5036 children under sixteen years of age. The total value of products increased 29.2 per cent. from 1890 to 1900, being in the latter year $184,074,378. The shallow depth of the water at the port of Providence has prevented the development of ocean traffic and thus has withheld from the State a great advantage. The raw materials of manufacture are transported long distances, and the centralization of the railroads has in a measure deprived the State of the advantages of competitive rates. Rhode Island has become well known for the superiority of certain of its products. The State has ranked second in cotton manufacture from the beginning of the industry, as estimated by the number of spindles employed. The spinning of cotton by the factory system began in 1790 at Pawtucket, and it was here that cotton was first spun by water power in the United States. As early as 1815 there were 140,000 spindles within a radius of 30 miles of Providence. Since 1890 a very slight decrease has taken place in the number of spindles, the number in 1900 being 1,920,522.

The manufacture of wool in the State by the factory process began in 1804; here the first power loom used in the manufacture of woolens in the United States was installed in 1814. Between 1890 and 1900 the production of worsted goods increased enormously, and the State ranks second in this branch of the woolen industry. But the value of other kinds of woolen goods has greatly decreased. The dyeing and finishing of textiles are industries which have increased enormously

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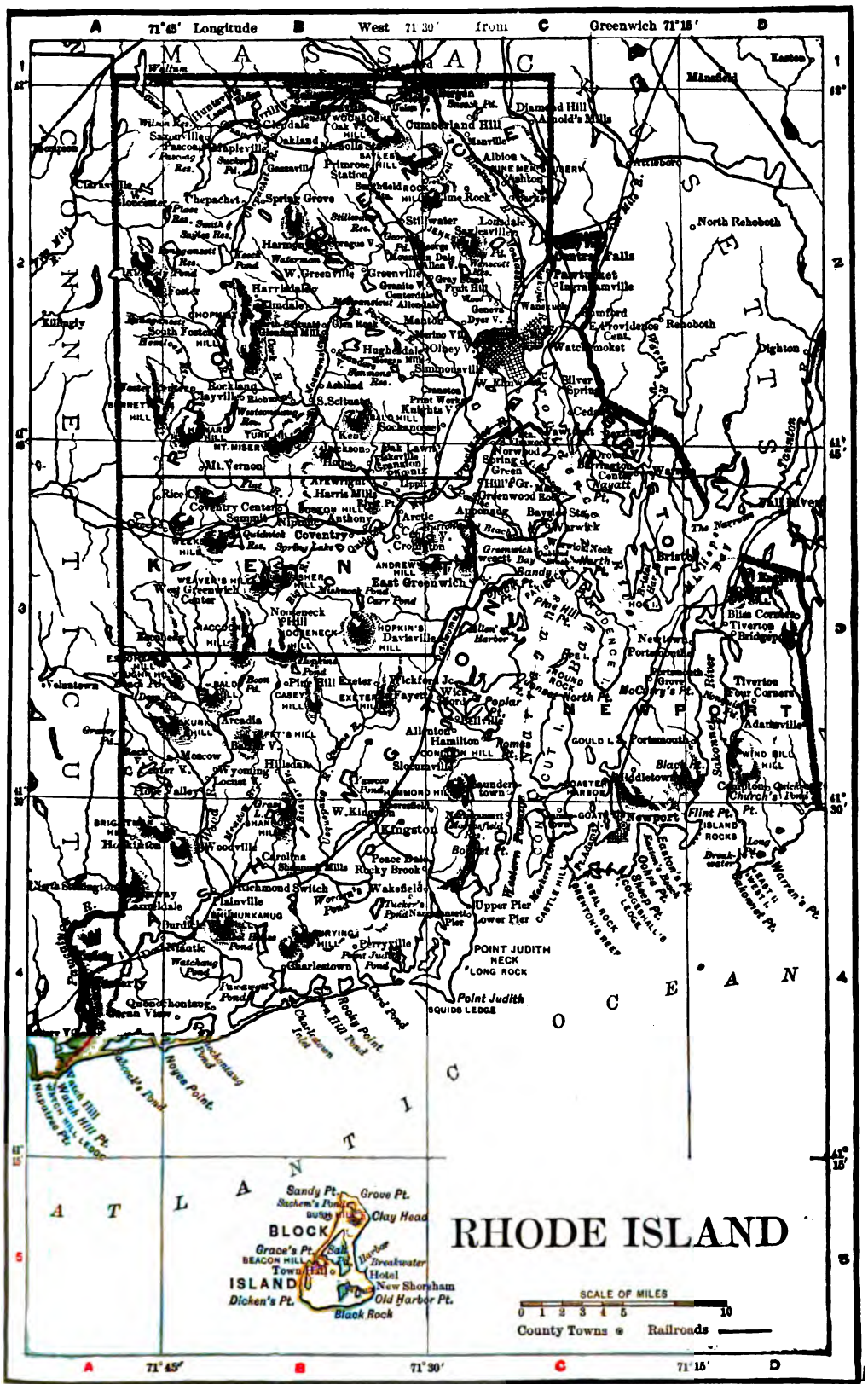

RHODE ISLAND

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AREA AND POPULATION OF RHODE ISLAND BY COUNTIES.

County.	Map Index.	County Seat.	Area in square miles.	Population.	
				1890.	1900.
Bristol	C 3	Bristol	25	11,428	13,144
Kent	B 3	East Greenwich	169	26,754	29,976
Newport	C 3	Newport	117	28,552	32,599
Providence	B 2	Providence	411	255,123	328,683
Washington	B 4	Kingston	331	23,649	24,154

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since 1890, as has also been the case with the silk and silk goods industry. Next in importance to the textiles are jewelry and silverware. The State ranks first in each of these and second in the reducing and refining of gold and silver not from the ore. These industries are almost wholly concentrated in Providence. They began here prior to the Revolution, but the prominence of the city in this respect dates from about 1894, when improved machinery was applied. All three of these industries made large gains in the decade 1890-1900. The foundry and machine-shop industry mainly turns out engines and boilers, for which the State has an established reputation. The manufacture of rubber boots and shoes (not included in the appended table) amounted in 1900 to $8,034,417 in value, and the manufacture of electrical apparatus reached $5,113,292 in the same year.

The following table shows the relative importance of most of the leading industries:

INDUSTRIES	Year	Number of establishments	Average number wage earners	Value of products, including custom work and repairing
Total for selected industries for State..	1900	614	66,381	$116,440,265
	1890	514	60,084	90,433,113
Increase, 1890 to 1900.....	.....	100	6,297	26,007,152
Per cent. of increase.....	.....	19.5	10.5	28.8
Per cent. of total of all industries in State...	1900	14.7	68.8	63.3
	1890	15.2	74.1	63.5
Foundry and machine shop products.....	1900	149	8,799	$13,269,086
	1890	101	6,876	10,170,286
Gold and silver, reducing and refining, not from the ore.....	1900	10	70	3,484,454
	1890	10	70	1,419,553
Jewelry.....	1900	214	4,877	13,320,620
	1890	179	4,092	8,011,067
Liquors, malt.....	1900	6	296	1,880,171
	1890	3	82	436,846
Rubber and elastic goods.....	1900	9	1,039	2,518,268
	1890	4	438	629,000
Silverware.....	1900	8	1,640	3,834,408
	1890	4	969	2,509,869
Textiles—total.....	1900	218	49,760	78,133,258
	1890	213	47,557	68,355,207
Cotton goods (including cotton small wares).....	1900	87	24 032	26,435,675
	1890	94	24,576	27,310,499
Dyeing and finishing textiles.....	1900	24	5,942	8,484,878
	1890	22	3,619	4,743,561
Hosiery and knit goods.....	1900	15	1,594	2,713,850
	1890	16	1,504	2,516,664
Shoddy.....	1900	9	131	515,643
	1890	10	132	1,350,792
Silk and silk goods.....	1900	6	455	1,311,333
	1890	3	186	229,062
Woolen goods.....	1900	26	2,710	5,330,550
	1890	40	5,912	9,884,945
Worsted goods.....	1900	51	14,896	33,341,329
	1890	28	11,628	22,319,684

TRANSPORTATION AND COMMERCE. The railroad mileage increased from 108 in 1860 to 217 miles in 1890 and decreased to 209 in 1900. All the important lines are under the control of the New York, New Haven and Hartford Railroad. The value of foreign imports at the port of Providence for the year ending June 30, 1901, was $1,146,511. The exports are altogether insignificant. Of greater importance is the coastwise traffic, there being a considerable trade with the important North Atlantic ports. Newport and Bristol and Warren are also customs districts, but the trade of both is small.

BANKS. The first bank of Rhode Island was the Providence Bank, founded in 1791. The early banking history of the State, however, centres around the Providence Institution for Savings, which dates from 1819. It has been the tendency during the past few years for the national banks and savings institutions either to liquidate or become trust companies. The report of the Comptroller of the Currency for the year ending June 30, 1902, gives the following statistics:

	National Banks	State	Savings
Number.....	36	3	24
Capital.....	$12,305,000	$395,000	.....
Surplus.....	3,788,000	.....	$3,338,000
Cash, etc.....	1,523,000	92,000	2,343,000*
Loans.....	27,472,000	1,003,000	31,789,000
Deposits.....	19,154,000	735,000	71,900,000

* Including amount due from banks and bankers.

GOVERNMENT. The State Constitution was adopted in 1842, replacing the original charter granted by King Charles II. An amendment proposed in the General Assembly must receive the votes of a majority of all the members elected to each House at two consecutively elected Assemblies, and then be approved by three-fifths of the electors present and voting in the town and ward meetings.

Since 1888 a residence and home in the State for two years and in the town or city for six months preceding an election have been required for voting, with a small additional property qualification for those voting for the city council of any city or upon any proposition to impose a tax or for the expenditure of money in any town or city. The capital of Rhode Island is Providence.

LEGISLATIVE. According to the amendment of 1900, the General Assembly meets on the first Tuesday of January in each year at Providence. Each town or city has one representative in the Senate, and one or more in the House of Representatives, but no town or city can have more than one-sixth of the 72 members to which the House is limited, and no town or city can be divided for purposes of representation. Senators and Representatives are paid according to time of actual attendance, with a maximum limit of 60 days, plus mileage. The House impeaches and the Senate tries all cases of impeachment.

EXECUTIVE. The Governor, Lieutenant-Governor, Secretary, Attorney-General, and Treasurer are annually elected at the same time and place as are Senators and Representatives, namely, at the town, ward, and district meetings, on the Tuesday next after the first Monday in November. They hold office one year. The Lieutenant-Governor succeeds to the Governorship in case of a vacancy, and in case of further vacancy the position is filled by appointment by the General Assembly acting in grand committee. The pardoning power is exercised by the Governor with the advice and consent of the Senate.

JUDICIAL. The judicial power is vested in one Supreme Court and such inferior courts as the General Assembly may establish, the powers of the several courts being prescribed by law. Judges of the Supreme Court are elected by the General Assembly in grand committee, and their term of office continues until their positions are declared vacant by a resolution of the General Assembly.

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FINANCES. The paper money system, which was prevalent throughout all the colonies, kept Rhode Island's finances in a continual state of disorder. The Revolution left the State with a large debt and heavy taxes, and this condition of affairs was not remedied until Rhode Island joined the Union. In 1789 the Revolutionary debt was repudiated by the passage of the compulsory tender act compelling creditors to accept paper money at an arbitrary rate. On January 1, 1902, the balance on hand in the treasury amounted to $158,272.71. The total receipts during the year were $1,490,621.96 and the expenditures $1,537,502.41. There was a balance on hand of $111,392.26 on January 1, 1903. The total debt was $2,998,000. From this sum, however, there should be deducted a sinking fund of $444,451.56.

MILITIA. In 1900 there were 95,737 men of militia age. The militia in 1901 numbered 1413.

POPULATION. The population increased from 68,825 in 1790 to 147,545 in 1850, 345,506 in 1890, and 428,556 in 1900. As to population, the State stood 34th in rank in 1900. There were in that year 407 inhabitants to the square mile, which figure exceeded that for any other State. There was a foreign-born population (1900) of 134,519, Ireland, Canada, and England being chiefly represented. The percentage of city population is very large. In 1900 Providence had a population of 175,597; Pawtucket, 39,231; Woonsocket, 28,204; Newport, 22,034; and Central Falls, 18,167.

The State sends two members to the National House of Representatives.

RELIGION. The principal Protestant denominations are the Baptist, with one-third of the total Protestant church membership, and the Protestant Episcopalians, with about one-fifth. The Roman Catholics have about one-fourth of the population.

EDUCATION. The public school system was established in 1828 and was greatly improved under the administration of Henry Barnard (q.v.). The proportion of illiteracy, due in large part to the numbers of foreigners, is greater than in any other of the North Atlantic States—8.4 per cent. in 1900. In 1900-01 the school population (5-15 inclusive) of the State was 85,084, of whom 69,067 were enrolled in schools. Of the 1960 teachers employed in the public schools in 1900-01 the male teachers constituted only 9.1 per cent. The average monthly salaries of male and female teachers in the same year were $115.32 and $51.14 respectively. The school fund is insignificant. The State has only one normal school. It is situated at Providence. The State maintains a college of agriculture and mechanic arts. For Brown University, see article.

CHARITABLE AND PENAL INSTITUTIONS. There are a State hospital at Providence and a soldiers' home at Bristol. There are two insane hospitals, one at Providence and the other at the State farm, Cranston. Other State institutions located at the State farm are the almshouse, workhouse, reformatory, and penitentiary. In 1901 the State appropriated $259,000 for the maintenance of the State institutions and $136,891 for construction.

HISTORY. The stories of Norse exploration within the present limits of the State rest upon slight foundation. True history begins when Roger Williams (q.v.) was banished from Massachusetts Bay, and settled with a few companions, at 'Providence Plantations,' on land purchased from the Narraganset Indians, probably in June, 1636. Already, however, William Blackstone, who had fled from the tyranny of the 'lords brethren' in Massachusetts, as he had left England to escape the 'lords bishops,' had settled near Pawtucket River. In March, 1638, a band of Antinomians banished from Massachusetts Bay, under the leadership of William Coddington and John Clark, made a settlement at Pocasset (Portsmouth), on Aquidneck Island (Rhode Island). The next year a secession from this settlement founded Newport, but in 1640 these two towns were united under William Coddington as Governor. In 1643 Samuel Gorton (q.v.) founded Warwick upon the mainland. At Providence the government was at first a pure democracy, "ignoring any power in the body politic to interfere with those matters which alone concern man and his maker." Each of these settlements was at first independent. In 1642 it was determined to seek a patent from England, and the next year Roger Williams went to England for this purpose. Through the influence of the Earl of Warwick, Parliament granted (1644) a charter uniting the settlements as the "Incorporation of Providence Plantations in the Narragansett Bay in New England."

The towns, at first, from jealousy and exaggerated ideas of individual importance, refused to enter into the confederation, but finally through fear of revolutions within, and of Massachusetts without, the union was formed in 1647. This jealousy lasted well into the nineteenth century and explains much of the peculiar conduct of the colony and of the State. Complete religious toleration was granted together with the largest measure of political freedom. William Coddington sought to bring the Island into relations with the United Colonies of New England, while President. In 1650 he went to England, and in 1651 secured a grant of the islands within the colony. Williams was able to have this grant vacated in 1652, but not until 1654 were the settlements again united. In 1663 the charter of Rhode Island and Providence Plantations was secured, and this served as a constitution until 1843. During the war waged on charters by James II., the charter of Rhode Island was abrogated by Sir Edmund Andros (q.v.), 1686-89, but on his deposition the old government was quietly renewed under it, though a property qualification for suffrage was added in 1724.

Relations with the other New England colonies were unpleasant. The colony suffered severely in the war with King Philip (q.v.), though opposed to the policy which caused it. Connecticut and Massachusetts claimed practically all of the territory included in the charter limits. The Connecticut boundary, after much wrangling, was finally settled in 1727, and the Massachusetts boundary was confirmed in 1746-47, but was not finally settled until 1862. Both of these colonies looked on Rhode Island as a nest of heretics and a refuge for the disaffected. The colony was shut out from the United Colonies of New England, and in every way made to feel her slight influence. Nevertheless the growth of the colony in population and wealth was steady, and many of the inhabitants turned to the sea for a livelihood. In the colonial wars Rhode Island privateers inflicted much damage, and some of her

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citizens were accused of piracy. In 1775 an army of observation was organized for the defense of the colony, and two of the thirteen ships ordered by Congress were built here. Rhode Island renounced allegiance to Great Britain on May 4, 1776, and united with the other colonies for defense. During the Revolution Newport was held (1776-79) by British troops, and in 1780 the French fleet was stationed there. The famous soldier of Rhode Island was General Nathanael Greene (q.v.). After the Revolution the State blocked every attempt to give increased power to Congress. This was partly due to the prevalent exaggerated individualism and partly to the desire to retain the right to levy import duties and to force her paper money into circulation. Much paper money had been issued early in the century and in 1786 another era of inflation began. The paper issued on land mortgages depreciated, but many attempts were made to make it a legal tender. A debtor might deposit with a judge of the court the sum owed and upon notice to the creditor the debt was legally satisfied. The notices began, "Know Ye," and hence the epithet applied in derision to residents of the State. The country or paper money party was in complete control, and a test act requiring all to regard the paper as equal to specie was passed.

The State refused to send delegates to the convention which drew up the Federal Constitution, and when that instrument was submitted for approval it was overwhelmingly rejected by the town meetings. Many attempts to call a convention to consider the Constitution failed, and it was not until threats of coercion had been made that the instrument was ratified, May 29, 1790. Though the commercial and manufacturing interests of the State grew rapidly, the power still lay in the country districts, as the basis of representation had not been changed since the granting of the charter, except to admit new towns. Dissatisfaction finally culminated in Dorr's Rebellion in 1841. (See DORR, THOMAS WILSON.) A new State constitution was adopted as a result in 1842, which has been frequently amended since. The property qualification for suffrage was not abolished until 1888, and election by a plurality has been allowed since 1893. Previously the election of Governor and State officers was often thrown into the Legislature. Until 1900 the Legislature met in Newport in April to canvass the vote and adjourned to Providence in January to transact business. Now all sessions are held in Providence. A prohibitory amendment to the Constitution was adopted in 1886, but was repealed in 1889. During the Civil War the State furnished more than her quota of troops. In national politics the State has been erratic. From 1792 to 1800 she gave her vote to the Federalist electors, but in 1804 was Democratic. In 1808 and 1812 the Federalists again secured control, but in 1816 and 1820 the State was once more Democratic. Rhode Island supported the tariff wing of the Democracy in 1824, but in 1828 was National Republican (the name originally borne by the Whig Party) and in 1832 Whig, only to be Democratic again in 1836. From 1840 to 1848 the Whig candidates received her votes, and in 1852 the State went back to Democracy. Since 1856, however, the State has been Republican in national elections:

GOVERNORS

Providence had no chief executive from its organization until the union under the patent in 1647.

PORTSMOUTH (Pocasset)

William Coddington	Judge	1638-39
William Hutchinson	"	1639-40

NEWPORT

William Coddington	Judge	1639-40

PORTSMOUTH AND NEWPORT

William Coddington	Governor	1640-47

PRESIDENTS OF COLONY UNDER PATENT

John Coggeshall	1647-48
William Coddington	1648-49
John Smith	1649-50
Nicholas Easton	1650-51

THE DIVISION 1651-54

PROVIDENCE AND WARWICK

John Smith	President	1651-53
Gregory Dexter	"	1653-54

AQUIDNECK (Portsmouth and Newport)

John Sanford	President	1653-54

THE REUNION; PRESIDENTS

Nicholas Easton	1654
Roger Williams	1654-57
Benedict Arnold	1657-60
William Brenton	1660-62
Benedict Arnold	1662-63

UNDER THE ROYAL CHARTER

Benedict Arnold	1663-66
William Brenton	1666-69
Benedict Arnold	1669-72
Nicholas Easton	1672-74
William Coddington	1674-76
Walter Clarke	1676-77
Benedict Arnold	1677-78
William Coddington	1678
John Cranston	1678-80
Peleg Sanford	1680-83
William Coddington, Jr.	1683-85
Henry Bull	1685 86
Walter Clarke	1686
Charter suspended by Governor Andros	1686-89
Henry Bull	1690
John Easton	1690-95
Caleb Carr	1695
Walter Clarke	1696-98
Samuel Cranston	1698-1727
Joseph Jenckes	1727-32
William Wanton	1732-33
John Wanton	1733-40
Richard Ward	1740-43
William Greene	1743-45
Gideon Wanton	1745-46
William Greene	1746-47
Gideon Wanton	1747-48
William Greene	1748-55
Stephen Hopkins	1755-57
William Greene	1757-58
Stephen Hopkins	1758-62
Samuel Ward	1762-63
Stephen Hopkins	1763-65
Samuel Ward	1765-67
Stephen Hopkins	1767-68
Josias Lyndon	1768-69
Joseph Wanton	1769-75

STATE GOVERNORS UNDER THE CHARTER

Nicholas Cooke		1775-78
William Greene, Jr.		1778-86
John Collins		1786-90
Arthur Fenner	Federalist-Republican	1790-1805
Paul Mumford (acting)	"	1805
Henry Smith "	"	1805-06
Isaac Wilbour "	"	1806-07
James Fenner	"	1807-11
William Jones	"	1811-17
Nehemiah R. Knight	Democratic-Republican	1817-21
William C. Gibbs	"	1821-24
James Fenner	Whig	1824-31
Lemuel H. Arnold	"	1831-33
John B. Francis	"	1833-38
William Sprague	"	1838-39
Samuel W. King	"	1839-43

GOVERNORS UNDER THE CONSTITUTION

James Fenner	Whig	1843-45
Charles Jackson	"	1845-46
Byron Diman	"	1846-47
Elisha Harris	"	1847-49
Henry B. Anthony	"	1849-51

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Philip Allen	Democratic-Free Soil	1851–53
Francis M. Dimond (acting)		1853–54
William W. Hoppin	American	1854–57
Elisha Dyer	Republican	1857–59
Thomas G. Turner	"	1859–60
William Sprague	"	1860–63
William C. Cozzens	"	1863
James Y. Smith	"	1863–66
Ambrose E. Burnside	"	1866–69
Seth Padelford	"	1869–73
Henry Howard	"	1873–75
Henry Lippitt	"	1875–77
Charles C. Van Zandt	"	1877–80
Alfred H. Littlefield	"	1880–83
Augustus O. Bourn	"	1883–85
George P. Wetmore	"	1885–87
John W. Davis	Democrat	1887–88
Royal C. Taft	Republican	1888–89
Herbert W. Ladd	"	1889–90
John W. Davis	Democrat	1890–91
Herbert W. Ladd	Republican	1891–92
D. Russell Brown	"	1892–95
Charles W. Lippitt	"	1895–97
Elisha Dyer	"	1897–1900
William Gregory	"	1900–01
Charles Dean Kimball	"	1901–03
Lucius F. C. Garvin	Democrat	1903—

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RHODES (Lat. *Rhodus*, from Gk. Ῥόδος). An island now belonging to Asiatic Turkey and long an important, wealthy, and independent State of ancient Greece. It lies off the southwest coast of Asia Minor, from the nearest point of which it is distant about 12 miles. It is 49 miles long and 21 miles in greatest breadth, and is traversed in the direction of its length—from northeast to southwest—by a chain of mountains, which reach in Mount Ataÿros (the ancient Atabyrion) a height of 4070 feet. The present population is about 30,000, of whom two-thirds are Greeks. The island is governed by a Turkish pasha, but is in general neglected, and shows few traces of its ancient prosperity. Its climate is temperate and its valleys are fertile, producing oil, oranges, citrons, etc.

Rhodes rose into importance at a very early period. It is certain that Ialysus was a place of trade during the second millennium B.C., for Mycenæan vases have been found in its necropolis. When the island first appears in history it is peopled by Dorians who dwell in three cities, Lindus, near the centre of the east coast, with a good harbor, and still a town; Camirus, on the west coast; and Ialysus, also on the west coast, near the northern end of the island. These cities, with Calymna, Cos, and Halicarnassus, formed the Doric Hexapolis which later, by the expulsion or withdrawal of Halicarnassus, became a Pentapolis. During the seventh and sixth centuries B.C. the island shared in the commercial prosperity of the Greek States of Asia Minor. A colony was planted at Phaselis, on the east coast of Lycia, and, alone of the Asiatic Greeks, the Rhodians took part in the first colonizing of Sicily, where they settled Gela, according to the tradition, about B.C. 690. A hundred years later, after an unsuccessful attempt at Lilybæum, another band settled the Lipari Islands. Secure from attack by land, and on friendly terms with the unaggressive naval powers of Phœnicia and Egypt, the island maintained its independence till the Persian conquest, and did not finally yield till after the Ionian revolt, at the beginning of the fifth century B.C. The Rhodians were among the Greeks who served with Xerxes, though their contingent was small. After the Greek victories, they joined the Delian League, thus passing ultimately into the Athenian empire. They revolted in B.C. 411, and in 408 the three cities combined to found a new capital of the island. This city, Rhodes (q.v.), henceforth represents the island. Excavations were begun on the Acropolis of Lindus in 1902 by Danish scholars, and in the first season the Propylæa and ancient Temple of Athena were discovered.

RHODES. The capital of the island of the same name, situated at its northern extremity, with harbors on the east side, and the Acropolis on a hill which rises abruptly from the west coast. The modern city, called Kastro, has a picturesque appearance from the sea as it rises gradually from the two harbors, now choked with sand. In ancient times the main harbor was fortified and could be closed. The present fortifications only include about one-fourth of the ancient city, and date largely from the fifteenth century. The place has preserved its mediæval aspect, and there are many traces on the stone houses of its occupation by the Knights of Saint John, besides the great castle, the hospital, and especially the straight and picturesque Knights' Road, lined with ancient buildings bearing coats of arms. The earthquakes of 1851, 1856, and 1863 wrought great destruction in the town. By the powder explosion of 1856 the Church of Saint John, built in 1500, and the Grand Master's palace, were badly damaged, and the two edifices were destroyed by the earthquake of 1863.

Rhodes was founded in B.C. 408, and was girt by strong walls, surmounted by towers, and provided with two excellent harbors. It soon attained wealth and a very important commercial position. The early years of the fourth century were marked by struggles between democracy and aristocracy, leading to interventions by Sparta and Athens. Rhodes joined the second Athenian League, but in B.C. 356, with Byzantium, Chios, and Cos, withdrew, thus bringing about the Social War, which ended in Athens conceding the independence of the allies. Rhodes, however, soon fell under the control of Mausolus of Caria, but again became free, though in B.C. 332 it voluntarily acknowledged Alexander. This King greatly favored the city, whose trade rapidly increased, though it was occupied by a Macedonian garrison. On the death of Alexander, B.C. 323, the Rhodians rose and expelled the intruders. The third and second centuries B.C. were the acme of Rhodian prosperity. Wealth had not corrupted the dignity and morality of the people. Art flourished, filling the city with statues and planting at the mouth of the harbor the famous Colossus (q.v.). A later school of art, probably in the first century B.C., produced the Laocoön. In the wars of the period the Rhodians seem to have sought to hold aloof unless their trading interests were threatened. Like the kings of Pergamum, they appealed to Rome as a better ally than their

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powerful neighbors, and joined in the war against Philip V. of Macedon. Later, during the war with Perseus, they endeavored to check the Roman advance, and the Roman Senate punished this presumption by making Delos a free port, with damaging effect on the Rhodian trade. After the death of Cæsar, whose side the Rhodians had taken against Pompeius in the civil war, they were defeated in a naval engagement by Cassius, who in B.C. 42 entered the city by force, massacred the hostile leaders, seized the public property, and rifled the temples. This visitation broke the power of Rhodes, but it long continued to maintain its prestige as a seat of learning. Even under the Roman Empire, Rhodes continued to maintain a nominal independence and was not attached to any province, except for brief periods, when in disgrace with the reigning Emperor. In the reorganization of the Empire by Diocletian this position was abolished, and Rhodes became the centre of the Province of the Islands. It was afterwards attached to the Byzantine Empire and shared its fortunes till in 1309 it was occupied by the Knights of Saint John of Jerusalem, who for over 200 years maintained themselves against the Turks, and even gained some foothold on the mainland. They withstood several sieges, notably one in 1480, but were attacked again in 1522 by Sultan Solyman the Magnificent, and after the most heroic resistance finally found their position untenable, and were forced to abandon the island. Consult: Berg, *Die Insel Rhodus* (Brunswick, 1862), with fine illustrations; Newton, *Travels and Discoveries in the Levant* (London, 1865); Guérin, *Voyage dans l'île de Rhodes* (2d. ed., Paris, 1880); Salzmann, *Nécropole de Camiros* (ib., 1875); Biliotti and Cottret, *L'île de Rhodes* (Rhodes and Compiègne, 1881); Tarr, *Rhodes in Ancient Times* (Cambridge, 1885); id., *Rhodes in Modern Times* (ib., 1887); Schumacher, *De Rhodiorum Republica* (Heidelberg, 1886); Gelder, *Geschichte der alten Rhodier* (The Hague, 1900).

RHODES, COLOSSUS OF. See COLOSSUS.

RHODES, CECIL JOHN (1853-1902). A South African statesman and financier, born at the vicarage of Bishop Stortford, Hertfordshire, England, July 5, 1853. In 1870 his name was entered at Oriel College, Oxford, but an affection of the lungs compelled him in the same year to sail for Natal, whence, in 1871, he made his way to the diamond fields at Kimberley. He speedily acquired a large fortune, and, with his health well restored, returned to matriculate at Oxford in 1873. From 1876 to 1881 he spent one half of the year at Oxford and at the end of that time took his B.A. and M.A. Early in life Rhodes gave evidence of the blending in him of the materialist and the dreamer. Shrewd in the advancement of his own interests, and not entirely unaffected by the loose ethics of the mining camp, he was possessed at the same time of a profound conviction of the virtues of the British imperial system, and he made it his life plan to extend the sway of the British Empire over South Africa. In 1880 he entered the Cape Parliament; there he directed his efforts toward the establishment of cordial relations between the English and the Dutch in the Colony, and was instrumental in bringing about the annexation of Bechuanaland in 1884. This was a forward step in the extension of British supremacy in South Africa, and brought the young statesman into conflict with the Boer Republic of the Transvaal, whose policy was guided by the ambitious and astute 'Oom Paul' Kruger, Rhodes's one formidable rival to the end. In 1888 Rhodes obtained from Lobengula, King of the Matabele, the cession of the immense region north of the Limpopo, which speedily came to be known as Rhodesia (q.v.), and in October, 1889, the British South Africa Company was incorporated, with almost full rights of sovereignty over that territory. Rhodes was in fact the sole manager of the company's affairs, and he devoted to the development of the country the resources of the De Beers Consolidated Mines, a corporation controlling the entire diamond industry at Kimberley, organized by Rhodes in 1888.

In 1890 Rhodes became Premier of Cape Colony, retaining at the same time his post as managing director of Rhodesia. He effected much salutary legislation within the Colony, first definitely entered upon the scheme of a British Cape-to-Cairo railway; found time to crush a formidable insurrection of the Matabeles in 1893; yet found time, too, to play an unscrupulous game of politics in the Transvaal, where the discontent prevailing among the foreign inhabitants of Johannesburg afforded him the opportunity for plotting the overthrow of the South African Republic. The Jameson raid in December, 1895, coming before his schemes were fully matured, was a crushing blow for Rhodes, who now appeared before the world as the instigator of a piratical attempt on the government of a friendly nation. (See TRANSVAAL; and JAMESON, LEANDER STARR.) He was forced to resign the Premiership of Cape Colony, and for a time his political influence was gone. For the next three years he devoted himself to the affairs of the Chartered Company, suppressed a second insurrection of the Matabeles in 1896-97, and hastened the northward advance of his transcontinental railway and telegraph lines. In 1898 he reëntered the Cape Parliament, and had made some progress toward regaining his predominant position in South African affairs, when the Boer war broke out. During the early part of the war he was besieged at Kimberley, where he was attacked by his old illness. He went to Egypt in the early part of 1901, but failing to find health there, returned in February, 1902, to Cape Colony, and died at Cape Town, March 26, 1902. He was buried on his estate in the Matoppo Hills, near Buluwayo, in Matabeleland.

Rhodes's character was the subject of much diverse criticism. By some he was regarded as preëminently a man of money, actuated entirely by selfish motives, and one who for the attainment of his ends did not scruple to plunge South Africa into war. To those of British inclinations he appeared rather as one of the great builders of empire, a descendant of Clive and Warren Hastings. This lineage, in great measure, cannot be denied Rhodes, though there may have been in him also a touch of Sir John Hawkins and Sir Francis Drake. Rhodes's will, by which he left almost his entire fortune for the purpose of educating the Anglo-Saxon youth to the idea of empire, radically modified previously formed estimates upon his character. (See RHODES SCHOLARSHIPS.) The various biographies of Rhodes naturally are prejudiced to a greater or lesser extent. "Vindex," *Political Life and*

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Speeches of Cecil Rhodes (London, 1900), is eulogistic, but contains much original material; "Imperialist," *Cecil Rhodes, a Biography and Appreciation* (ib., 1897), is favorable and well written. The best life on the whole is that by Hensman, *Cecil Rhodes* (ib., 1902), favorable, but not altogether apologetic. Stead, in the *Review of Reviews* (1902), gives a remarkable study of the psychology of Rhodes.

RHODES, JAMES FORD (1848—). An American historian, born in Cleveland, Ohio, May 1, 1848. He was educated in the public schools and at the universities of New York and Chicago, but he did not graduate, though the degree of LL.D. was afterwards conferred upon him. He was Paris correspondent of the Chicago *Times* (1867-68) and made journeys of industrial investigation in Germany and England, which he continued afterwards in the Southern United States. Then he engaged in business in Cleveland, Ohio, until 1885, when he retired and devoted himself to a *History of the United States from the Compromise of 1850*, a political narrative and analysis of the events growing out of slavery, the Civil War, and the reconstruction era, giving special prominence to Congressional and other political debates and to characterizations of public men, and emphasizing the influence of public opinion. The first two volumes (1892) carry the narrative to 1860; the third (1895) to 1862; the fourth (1901) to the close of the war. He became president of the American Historical Association in 1899 and was awarded an important German prize for his researches. His narrative, although based mainly on Northern sources, is impartial and sober, and is generally considered to be the best work covering the period treated.

RHODES, LAW OF. A code apparently drawn up by the Rhodians at the time of their great naval power in the third century B.C., though it is only known from the references in Roman law. The code was declared binding by Antoninus Pius, in so far as it did not conflict with Roman law, but its provisions are not known, except that "if cargo is thrown overboard to lighten a ship, all must contribute to make good the loss incurred for the benefit of all," a doctrine still accepted in maritime law. The treatise, *Ius Navale Rhodiorum*, is nothing but a group of mediæval forgeries. See CONSOLATO DEL MARE; OLERON, LAWS OF.

RHODESIA, rōd'zĭ-ȧ *or* rō-dē'shĭ-ȧ, NORTHERN. A division of British Central Africa, under the administration of the British South Africa Company. It comprises the territory bounded by the Congo Free State and German East Africa on the north, the British Central Africa Protectorate and Portuguese East Africa on the east, the Zambezi River on the south, and Portuguese West Africa on the west (Map: Congo, E 6). It is divided into Northeastern and Northwestern Rhodesia, the latter being also known as Barotseland. Unlike Southern Rhodesia, Northern Rhodesia has been only slightly explored and is still practically held by the natives. Barotseland or Northwestern Rhodesia is under the rule of King Lewanika, who, however, is advised by a resident of the British South Africa Company. His chief kraal is on the eastern bank of the Zambezi, at Lialui. Gold and coal have been found. Barotseland is well watered and fertile, but its climate is unhealthful. Northeastern Rhodesia is divided into nine districts, with Fort Jameson as the seat of administration. The population of Northern Rhodesia is estimated at about 400,000. The Europeans in Northeastern Rhodesia numbered 165 in 1901.

RHODESIA, SOUTHERN. A British South African protectorate under the administration of the British South Africa Company. It occupies the territory between the Zambezi on the north, the Limpopo on the south, Portuguese East Africa on the east, and the British Bechuanaland Protectorate on the west, comprising the countries of Matabeleland and Mashonaland and the districts of Banyai, Manica, and Makalaka (Map: Cape Colony, H 1). Its area is estimated at 175,000 square miles. The larger part of the country is an elevated veld, well wooded and studded with granite kopjes which attain a considerable height in Mashonaland. The country is well watered by the tributaries of the Zambezi and the Limpopo and is covered with a luxuriant vegetation. The climate is healthful in the elevated districts, which occupy the larger part of the country, but is malarial and oppressive in the valleys of the Zambezi and the Limpopo.

The mineral deposits of Southern Rhodesia include gold, coal, copper, silver, antimony, arsenic, and lead. Gold is found principally in the central part of Mashonaland in the valleys of the Umtali and the Imbesi rivers. The gold deposits of Southern Rhodesia show traces of ancient workings. Their exploitation has been hindered by the lack of transportation facilities and of labor. The total output from 1890 to 1902 amounted to 194,170 ounces. Extensive coal deposits were discovered in 1900 in the Wankies district, in the western part of Mashonaland, and a company has been formed for its exploitation.

Apart from its rich mineral resources, Southern Rhodesia possesses a fertile soil and is well adapted for grazing. From 1890 to 1901 there were surveyed over 18,000,000 acres of land. Good crops of European cereals are raised. But the development of agriculture as well as that of the mineral industries is crippled by the scarcity of labor. Salisbury, the capital, is connected by rail with Cape Colony as well as with Beira, on the coast of Portuguese East Africa. From Buluwayo the line is being extended through the Wankies coal fields to Victoria Falls on the Zambezi and from there it is proposed to continue the road through Northern Rhodesia to Lake Tanganyika. A light railway line has also been completed from Salisbury to the Ayrshire mine in the Lomogundi district. The roads are over 3000 miles long. Salisbury and Buluwayo have been organized into municipalities and are provided with all the institutions of modern cities.

The administration of Southern Rhodesia is vested in the British South Africa Company, but there is also a resident commissioner appointed by the Secretary of State for the Colonies. The executive council is composed of the resident commissioner, the administrators of the company, and not less than four members appointed by the company with the approval of the Secretary of State. The legislative council is made up of the administrator of the company, the resident commissioner, five members appointed by the company, and four members elected by the registered voters, two for each of the provinces of Mashona-

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land and Matabeleland. The judges of the High Court are appointed by the Secretary of State from a list submitted by the company. The native affairs are under the control of a secretary who is assisted by native commissioners. The military police of the territory is under the control of the High Commissioner for South Africa. According to an informal census taken in 1901 Mashonaland contained 4021 Europeans, 328,729 natives, and 187 Asiatics; and Matabeleland 7011 Europeans, 162,211 natives, and 906 Asiatics.

In the first half of the nineteenth century the territory now known as Southern Rhodesia was held by the Matabeles, who were forced by the Boers to retreat north of the Limpopo. With the discovery of gold in that part of the continent Cecil Rhodes succeeded in concluding a treaty with Lobengula, under which the chief of the Matabeles bound himself not to enter into any agreement with any power without the approval of Great Britain. In 1880 the mining rights over the territory were also secured by Cecil Rhodes (q.v.) for a consideration of a monthly salary of £100 to Lobengula, 1000 rifles, and a large quantity of ammunition. A royal charter was obtained for the British South Africa Company in 1889, and a considerable military force was sent to explore the interior of the country. An uprising of the Matabeles in 1893 ended in the overthrow of Lobengula and the formal annexation of Matabeleland. A more serious uprising occurred after the withdrawal of the white police to Bechuanaland, in 1896. The rebellion soon spread to Mashonaland, and it was only with the assistance of troops dispatched from Natal and Mafeking that peace was restored in 1897.

BIBLIOGRAPHY. Greswell, *Geography of Africa South of the Zambezi* (London, 1893); Keane, *South Africa* (ib., 1895); Keltie, *Partition of Africa*, contains bibliography (ib., 1895); Thomson, *Rhodesia and Its Government* (ib., 1898); Dawkins, *Précis of Information Concerning Southern Rhodesia*, with bibliography (n.p. 1899); Hall and Neal, *The Ancient Ruins of Rhodesia* (New York, 1902).

RHODES SCHOLARSHIPS, THE. A number of stipends established under the will of Cecil John Rhodes (q.v.), who died in 1902, bequeathing a large part of his estate in trust for the purpose of maintaining a certain number of British, American, and German students at Oxford University, in the belief that "a good understanding between England, Germany, and the United States will secure the peace of the world, and that educational relations form the strongest tie." The founder suggested the following basis for awarding these scholarships: (1) Proficiency in literary and scholastic attainments, which was to count three-tenths; (2) success in outdoor sports, two-tenths; (3) qualities of manhood, etc., three-tenths; (4) qualities of leadership, two-tenths. Qualifications second and third were to be decided upon by a vote of the fellow students, first and fourth by the masters of the respective schools where candidates prepare. The number of scholarships to be thus distributed are as follows: Rhodesia, 9; Cape Colony, 12; Natal, 3; Australia, 18; New Zealand, 3; Canada, 6; Newfoundland, 3; Bermuda, 3; Jamaica, 3; two to each State and Territory of the United States, and 15 to Germany. The annual value of the Colonial and American scholarships is £300, tenable for three years. Only one-third of the Colonial and one-half of the American scholarships are to be filled each year. The disposal of the German scholarships is at the pleasure of the Emperor.

In the United States the first qualifying examination, based on the Oxford Responsions, or the first Oxford public examination, was set down for 1904, and was to consist of Latin, Greek, and elementary mathematics. These examinations are to be held under the auspices of the State committees designated by the trustees for selecting suitable candidates for the scholarships. The chairmen of these committees are either the presidents of the State Universities, as is the case in most of the Western and Southern States, or the Presidents of certain prominent universities, as is the case in most of the New England and Eastern States. In California, Maine, Vermont, and Washington, appointments are to be made by the several chartered universities and colleges in rotation. Candidates must be from 20 to 25 years of age and must have attended two years at a recognized institution of higher learning. Scholars must be unmarried and citizens of the United States.

RHODIUM (Neo-Lat., from Gk. *ῥόδιος*, rose-like, from *ῥόδον*, *rhodon*, rose). A metallic chemical element that was discovered by Wollaston in 1804. It occurs with other members of the platinum group and alloyed with gold as 'rhodium gold,' or *rhodite*, a mineral found in Mexico. The element is separated by adding iron to the mother liquors from which platinum has been extracted. The precipitate thus obtained is fused with lead and litharge, after which lead, copper, and palladium are removed by dilute nitric acid, and the residue heated with barium dioxide, then washed and distilled with aqua regia to remove osmium. The remaining solution contains the rhodium, which is then isolated by a somewhat complicated process.

Rhodium (symbol, Rh; atomic weight, 103.01) is a white, hard, malleable metal that fuses at about the same temperature as platinum, and absorbs oxygen like that metal. It combines with oxygen to form a monoxide, a sesquioxide, a dioxide, and probably a trioxide. The metal itself, when added in small quantities to steel, is said to form an alloy that has exceedingly valuable properties.

RHO'DODEN'DRON (Neo-Lat., from Gk. *ῥοδόδενδρον*, oleander, from *ῥόδον*, *rhodon*, rose + *δένδρον*, *dendron*, tree). A genus of about 200 trees and shrubs, including Azalea (q.v.), of the natural order Ericaceæ. The species of Rhododendron proper have evergreen leaves, and many of them are of great beauty both in foliage and in flower. They vary in size from a few inches in height to trees 50 to 60 feet high and 18 inches in diameter. A few small species are natives of Continental Europe and of Siberia, but the greater number are found in temperate North America, and in the mountains of India. *Rhododendron maximum*, so designated when the far larger Indian species were unknown, is a common American ornamental shrub or small tree which forms impenetrable thickets in the Alleghany Mountains, and is magnificent when in flower. The flowers are large, in umbellate corymbs, varying in color from pale carmine to lilac. *Rhododendron ponticum*, a very

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similar species with narrower and more pointed leaves, of the same color on both sides, is a native of Western Asia, and apparently also of Southern Spain. *Rhododendron catawbiense*, a native of the southern Alleghanies, with large purple flowers, and *Rhododendron arboreum*, a native of Nepal, with very dense heads of large scarlet flowers and leaves 12 to 18 inches long, attaining a height of 30 to 40 feet in its native

RHODODENDRON (*Rhododendron ponticum*).

country, are fine and well-known species; *Rhododendron Californicum* and *Rhododendron macrophyllum* are among the most conspicuous species of the Pacific Coast region. Most of the extremely numerous varieties common in gardens and shrubberies have been produced from them. In many if not most of the hybrids, *Rhododendron Catawbiense* enters, and in a list published in 1871, 250 named hybrids of this species are mentioned. Since that time the number has undoubtedly greatly increased.

Many splendid species of Rhododendron have been discovered in the Himalaya, the Khasia Hills, and other mountainous parts of India, by Hooker and others; and some of them have been introduced into cultivation. *Rhododendron grande* has very beautiful flowers 4½ inches in diameter. *Rhododendron Maddeni*, *Rhododendron Griffithianum*, *Rhododendron Edgeworthii*, and others have white flowers. *Rhododendron Dalhousiæ* is remarkable as an epiphyte, growing on magnolias, laurels, and oaks. It is a slender shrub, bearing from 3 to 6 white lemon-scented terminal bells, 4½ inches long. *Rhododendron Nuttallii* has fragrant white flowers, said to be larger than those of any other species. All these belong to the Himalayas. In more southern latitudes, as on the Neilgherry Hills and on the mountains of Ceylon, *Rhododendron barbatum* prevails as a timber tree, a blaze of crimson when in flower. *Rhododendron Keysii* and *Rhododendron cinnabarinum*, natives of Northern India, have flowers with nearly tubular corollas. *Rhododendron ferrugineum* and *Rhododendron hirsutum* are small Alpine shrubs from 1 to 3 feet in height with umbellate clusters of carmine-colored flowers among the finest ornaments of alpine scenery. They are called *alpenrose* (alpine rose) by the Germans, and are not easily cultivated in gardens. The flora of the Himalaya contains a number of similar small species. *Rhododendron setosum*, a dwarf shrub with strongly scented leaves, clothes the mountains in Eastern Nepal at an elevation of 12,000 feet and upward, with a green mantle, brilliant with flowers in summer. *Rhododendron nivale* is the most alpine of woody plants, spreading its small woody branches close to the ground, at an elevation of 17,000 feet in Sikkim. *Rhododendron lapponicum*, a procumbent shrub, with small flowers, grows as far north as human settlements have reached in Europe and Asia. An oil obtained from the buds of *Rhododendron ferrugineum* and *Rhododendron hirsutum* have been used by the inhabitants of the Alps under the name *olio di marmotta*, as a remedy for various ailments. The flowers of *Rhododendron arboreum* are said to be eaten in India, and Europeans make a jelly of them. The wood of some of the larger species is white, hard, and close-grained, and has been recommended as a possible substitute for boxwood. Rhododendrons are not of difficult culture, a soil containing plenty of leaf mold and protection from drought and winter scalding being the prime necessities for growing the hardier species in shrubberies and parks. See Colored Plate of AZALEAS AND RHODODENDRONS.

RHODONITE (from Gk. *ῥόδον*, *rhodon*, rose). A mineral manganese silicate that crystallizes in the triclinic system, has a vitreous lustre, and is usually red, although sometimes green or yellow. It occurs frequently in association with iron and zinc ores, and is found in Sweden, the Harz, the Urals, and in the United States at various localities in Massachusetts, and in Sussex County, N. J., where part of the manganese is replaced by zinc, giving rise to a variety known as *fowlerite*. The massive varieties of this mineral, especially those found in the Ekaterinburg District in the Urals, are used for ornamental purposes, as for table tops, etc., while varieties from other places are used to a limited extent as gems.

RHODOPHYCEÆ (Neo-Lat. nom. pl., from Gk. *ῥόδον*, *rhodon*, rose, + *φῦκος*, *phykos*, seaweed). The red algæ. The most beautiful of the four great groups of algæ. Some are very complex in structure, but in general they show less vegetative differentiation than do the brown algæ (Phæophyceæ, q.v.). Their peculiarities lie chiefly in a highly developed method of sexual reproduction, resulting in a complex fruit (cystocarp), which contains the carpospores. (Figs. 1, 2.) The male cells (spermatia) are non-motile, and fuse with a thread-like female receptive organ (trichogyne). There is also a form of asexual reproduction generally of four special spores (tetraspores). (Fig. 1.) Most Rhodophyceæ are red or reddish brown, a color due to a peculiar pigment (phycoerythrin) which obscures the green pigment (chlorophyll).

The form of the body ranges from minute filaments of great delicacy to broad membranes and thick cartilaginous fronds. Some of the membranous forms are several feet long (Delesseria), and may be differentiated into a stem and leaf-like out-growths. Others form filamentous branching tufts (Callithamnion, Dasya). Some groups bear

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protruding fruits resembling urns (Polysiphonia, Fig. 2), others are pinnately branched (Ptilota), others with incurved tips (Ceramium). Most of the filamentous and membranous species, especially those which grow in quiet waters, are very delicate. Many forms on surf-beaten coasts develop large and strong cartilaginous fronds. Several of these firmer forms yield a jelly when placed in hot water; for instance, agar-agar is derived from species found in Ceylon, Java, and Madagascar, and Chondrus crispus furnishes most of the 'Irish moss' used in cookery. These preparations consist mainly of mucilage of little or no nutritive value, derived from intercellular spaces and swollen cell-walls.

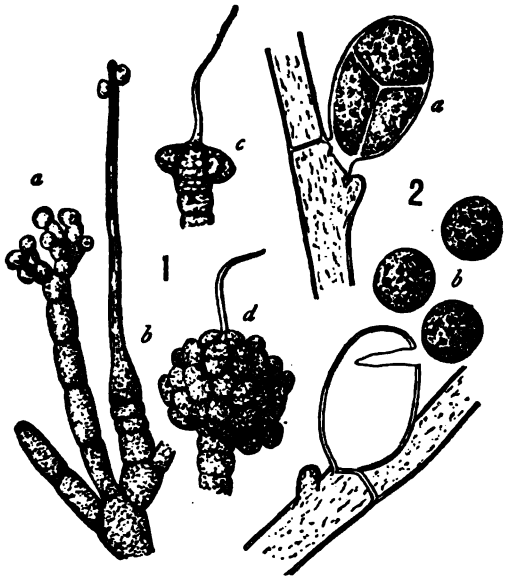

FIG. 1. RED ALGÆ.

1, Nemalion, sexual branches, showing antheridia (a) and carpogonium (b) with trichogyne to which two spermatia are attached, beginning of a cystocarp (c), and an almost mature cystocarp (d); 2, Callithamnion, showing sporangium (a) and three discharged tetraspores (b).

FIG. 2. POLYSIPHONIA.

Showing branching, a cystocarp (a), and escaping spores (b).

Perhaps the most remarkable group of the Rhodophyceæ is the Corallines, with highly specialized fructifications and tetraspores borne in differentiated conceptacles. Some are branched, with jointed segments, others have the form of convoluted nodules. They are so incrusted and pervaded with lime as to resemble coral.

Consult: Engler and Prantl, *Die natürlichen Pflanzenfamilien* (Leipzig, 1887 et seq.); Murray, *Introduction to the Study of Seaweeds* (London, 1895).

RHODO'PIS (Lat., from Gk. Ῥοδῶπις). A famous Greek courtesan, a native of Thrace. At one time she was a fellow slave of the poet Æsop. Later she was carried to Naucratis, in Egypt. While she plied the trade of hetæra there Charaxus, brother of Sappho, fell in love with her and ransomed her at a great price. She was attacked by Sappho in a poem. After her liberation she continued to reside in Naucratis.

RHOMBOID. See PARALLELOGRAM.

RHOMBUS. See PARALLELOGRAM.

RHONDDA, rŏnd'dȧ. An important and populous coal-mining district, now a municipality of Glamorganshire, Wales. It is situated amid picturesque valley scenery on the Rhondda River, near Merthyr Tydfil. Population, in 1891, 88,350; in 1901, 113,700.

RHONE, rōn (Fr. *Rhône;* Lat. *Rhodanus*). The principal river of Southeastern France. It rises at an altitude of 7550 feet in the Rhone Glacier on the south slope of the Dammastock, a peak of the Urner Alps in South Central Switzerland (Map: France, L 7). It flows first in a general southwest course through Southern Switzerland and into France as far as Lyons, then due south until it empties into the Gulf of Lyons in the Mediterranean Sea, 25 miles west of Marseilles. Its length is 504 miles. Its upper course is through the great valley lying between the Bernese and the Pennine Alps, which forms the Swiss Canton of Valais. Here it grows rapidly by taking up a number of short but voluminous mountain torrents fed by the great glaciers which cap the mountain ranges on either side. At Martigny the valley is narrowed and the river makes a sharp turn to the northwest, becomes then navigable below Saint-Maurice, and enters the eastern end of Lake Geneva. It leaves the lake at its western end at Geneva, resuming its southwest direction, quits Swiss territory, and soon after passes through the Jura Range in a deep and narrow gorge, where its width is decreased from 350 to 25 yards. Here it formerly disappeared through a subterranean channel known as the Perte du Rhône, but the rocks which covered it were removed in 1828. After leaving the gorge it becomes again navigable, and remains officially so to its mouth.

Its fall from Lyons to the sea, a distance of 208 miles, is over 500 feet, or 2½ feet per mile. Its course below Lyons lies in a broad, fertile, and beautiful valley between the Alps and the Cévennes. It receives here two large tributaries, the Isère and the Durance, the latter joining it at Avignon, below which town the river flows through a sandy and arid tract which was formerly a gulf of the sea. Its delta, whose main arms are the Grand and the Petit Rhône, which form the Ile de la Camargue (see BOUCHES-DU-RHÔNE), is growing at the rate of nearly 200 feet annually, owing to the large quantities of sediment carried by the stream. The navigation of the Rhone, owing to the swift current, the shifting of the bed, and the numerous islands, is very difficult even for steamers, and especially on the upstream route. Extensive regulating works have to some extent improved the waterway above the delta, and the shifting and sand-barred mouths of the latter have been obviated by a short canal

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running from the Gulf of Foz to the main stream, while other canals connect the latter with several ports on the Gulf of Lyons, one being projected to the port of Marseilles. Canals also connect the Saône with the Loire, the Seine, and the Rhine.

Consult: Barron, *Les fleuves de la France: Le Rhône* (Paris, 1900); Lenthéric, *Le Rhône, histoire d'un fleuve* (ib., 1892); Wood, *In the Valley of the Rhone* (London, 1899); Lombard-Gerin, *Notes sur le tonnage du Rhône* (Paris, 1900).

RHÔNE. A southeastern department of France (Map: France, L 6). Area, 1077 square miles. It lies almost wholly in the basin of the Rhone and its great affluent the Saône, its eastern boundary being formed by these rivers. The surface is almost entirely mountainous or hilly, the chief level stretches being the valley of the Saône and the district about Lyons. The principal productions are wine and silk. The wines are famous for their excellent quality. About one-tenth of the surface is in vineyards. Silks are manufactured extensively, and numerous other branches of manufacture are actively carried on. Capital, Lyons (q.v.). Population, in 1896, 839,239; in 1901, 843,179. Consult: Varnet, *Géographie du département du Rhône* (Lyons, n. d.); Lenthéric, *La région du Bas-Rhône* (Paris, 1881); Joanne, *Géographie du département du Rhône* (ib., 1900).

RHÔNE, Bouches-du-. A department of France. See Bouches-du-Rhône.

RHUBARB (ML. *rhubarbarum, rheubarbarum, reubarbarum, rheum barbarum*, from Gk. *ῥῆον βάρβαρον*, rhubarb, from *ῥῆον, rheon*, rhubarb, and *βάρβαρος, barbaros*, barbarous, foreign), or Pie Plant (*Rheum*). A large, coarse genus of Asiatic herbs of the natural order Polygonaceæ, closely allied to Rumex (dock and sorrel). The rhubarb of commerce, which comes from inland parts of China or Chinese Tartary, is produced by an unknown species.

The leafstalks of rhubarb contain an agreeable mixture of citric and malic acids, and when young and tender are highly esteemed for stewing and preserving, for which purpose the plants are widely cultivated in temperate and cold countries. Several species have been introduced into cultivation for their leafstalks. *Rheum Palmatum*, the first species known, and once believed to yield Turkey rhubarb, has roundish green leafstalks and half-palmate leaves. Its stalks are inferior for the table. *Rheum undulatum, Rheum rhaponticum*, and *Rheum hybridum* have broad, heart-shaped, undivided leaves, upon flattened, often reddish leafstalks grooved on the upper side. In some of the finest varieties the flesh is red. In Continental Europe rhubarb is grown more as a foliage plant than as a vegetable. Rhubarb is propagated by seed, or by dividing the roots. It prefers a light rich soil, which should be heavily manured every year. The plants are placed three or four feet apart, according to the size of the variety. Rhubarb is forced in winter and early spring by having pots or barrels inverted over it, and fresh litter or horse manure heaped around. It is also forced under greenhouse benches and in cellars, the roots being frozen before removal to the heat. As a medicine rhubarb roots are considered to be cathartic, astringent, and tonic. See Plate of Vegetables.

RHUMB LINE, or Loxodromic Line. The course of a ship which is sailing in an oblique direction always to one point of the compass. It is a curve on the surface of the terrestrial sphere which has the property of cutting all meridians at the same angle. The rhumb line appears as a straight line on Mercator's projection. (See Map.) A ship sailing obliquely to the direction of the North Pole (say, two points off) would wind round it in infinite circuits, always approaching nearer, but never reaching it. In this property, as well as in others, the loxodromic line is analogous to the common logarithmic spiral. See Loxodrome; Navigation; Sailings.

RHUS. A genus of shrubs and trees. See Sumach; Poisonous Plants.

RHYL, rĭl. A popular tourist and sea-bathing resort in Flintshire, Wales, at the mouth of the Clwyd, 10 miles northwest of Denbigh (Map: Wales, C 3). It has a fine beach, esplanade, promenade pier, aquarium, and winter garden, golf links, etc. Zinc ore is mined in the vicinity. Much municipal activity has been evinced in public improvements to add to the natural attractions. The town owns its water-works, gas, and electric lighting plants, markets, and cemetery; maintains promenades, marine walks, and recreation grounds; and has installed modern sewage disposal works. Population, in 1891, 6500; in 1901, 8500, with a transient summer population of 20,000.

RHYME, or **RIME** (AS., OHG. *rîm*, number, Ger. *Reim*, rhyme). In the broader meaning, a poem, or numbered or versified composition, as when we speak of the "Mother Goose Rhymes;" also, by a slight extension, a synonym for poetry in general. In the more technical sense rhyme is the recurrence of the same sound, in a verse or verses, in syllables having corresponding metrical values. Rhymes are of three general types: they may be formed by the correspondence of the initial sounds of the rhyming syllables, in which case they are called head-rhyme or alliteration; they may be formed by the correspondence of the vowel element, in which case, if the succeeding consonant sounds differ in the rhyming syllables, we have assonance, while if the succeeding consonants are the same in sound, or if there are no consonants, we have true rhymes. Alliteration was the characteristic rhyme of the ancient Teutonic poetry, while assonance was first systematically developed in the early Romance literatures. In modern literature both of these types have yielded in large measure to the more perfect music of the true rhyme, but they have not, as is sometimes stated, ceased to be in good form. Most commonly, in modern poetry, they are used in connection with rhyme. Thus, in *The Symphony*, Sidney Lanier combines rhyme and alliteration:

> Woe *h*im that cunning trades in *h*earts contrives!
> Base *l*ove good women to base *l*oving drives.
> If men loved *l*arger, *l*arger were our *l*ives;
> And wooed they nobler, won they nobler *w*ives.

And in the same poem rhyme and assonance are combined in:

> *Vainly* might Plato's *brain* revolve it;
> *Plainly* the heart of a child could solve it.

The placing of rhyming words in the verse structure varies with the different kinds or with varying types of verse-composition. Alliteration is characteristically complete in a single verse,

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and in Anglo-Saxon poetry usually consisted of a three-fold repetition of the alliterated sound, as in the third and fourth lines of the first quotation above given. End-rhymes, on the other hand, may be completed within a single verse, but are ordinarily between two or more verses, the number being determined by the stanzaic structure or the taste of the poet; in the rondeau, for instance, one rhyme is repeated eight times and the other five. Not infrequently poems are constructed having both styles of rhyme, as in Shelley's *Cloud:*

> I bring fresh *showers* for the thirsting *flowers*,
> From the seas and the *streams;*
> I bear light *shade* for the leaves when *laid*
> In their noonday *dreams*.

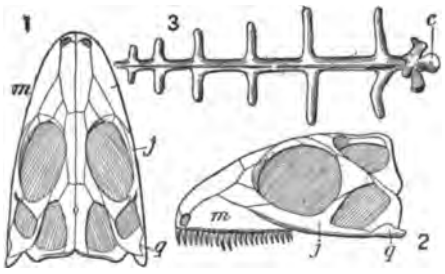
Rhymes, of whatever sort, are in modern poetry always placed upon accented syllables, and end-rhymes are characteristically placed either at the end of the verse or at the end of the colon, as in the first and third verses here given. They may, however, be placed elsewhere, even at the beginning of the verse, as in the second citation from Lanier's *Symphony*. In complicated structures they are often used with less regard to regularity, internal rhymes being carried on in verse endings, or placed within the verse itself without regard to cæsural pauses. In general, however, internal rhymes irregularly placed convey an effect of assonance rather than of true rhyme, and many poets make use of assonance in preference to it, when so placed. As to the relation of rhyming verses, this is determined either by the form of the stanza or in non-stanzaic rhymed composition by some set order, as the couplet, which the poet may determine, or again the rhymes may occur irregularly. Stanzas are of indefinite variety, and the poet is at liberty to invent whatever forms may please his ear.

Not all languages agree as to the nature of the adequate rhyme. In English, words which rhyme perfectly must agree in all the sound elements succeeding the initial element of the last accented syllable, and in this element they must differ. In French, on the other hand, such a rhyme is only *suffisante*, the *riche* or perfect rhyme having identical *all* the elements in the rhyming syllables. Thus, *grows* and *rose* form a perfect rhyme in English, *rose* and *arrose* in French. Rarely in English an identical rhyme is used provided the sense be changed, as *reign* with *rein*, *lo* with *low* (change of sense is also always necessary in French), but the change must be more than a mere negation; in no case should *close* and *disclose* be rhymed, nor words having the same root, as *compute*, *dispute*. When a word is repeated to rhyme with itself, as is frequently the case in Poe's poems, for example, it has the value of a refrain rather than of a true rhyme, and in all such cases there should be at least one other word rhymed with it. There are a few words in English the pronunciation of which may be altered to suit the needs of rhyme; thus, *wind* (noun) may be rhymed with *blind*, etc., but this is only a form of poetic archaism, reverting to the original pronunciation of the word. Rhymes are 'masculine' and 'feminine;' masculine when the rhymed syllable is also the chief accent of the word, *aver*, *deter; mar*, *tar;* feminine when it is followed by unaccented syllables, *marry*, *tarry; tenderly*, *slenderly*. Sometimes a secondary accent is made to carry the rhyme, but in such cases it is generally rhymed with a word having no great rhetorical stress or having other words rhymed with it. The use of feminine rhymes is the less common in English, and they are never to be found in the complicated form to be met with in some other languages. (Compare the Persian under RUBAIYAT.) They occur most freely in satirical verse, which often takes liberties with rhyme that no serious poetry could tolerate. An example from Lowell is:

> Though you brag of your New World, you don't
> half believe in it;
> And as much of the Old as is possible weave in it.

Rhyme was of relatively slight value in verse which depended upon quantity rather than accent and in languages which abounded in elaborate inflections. It was not until the classical Latin gave way to the vulgar speech that rhyme became the rule, first in the early hymns of the Christian Church. It is possible that an ancient Celtic influence may have aided this development, since the Celts used rhyme in the oldest Celtic poetry preserved to us. Rhyme was elaborately developed among the Persians and Arabs of mediæval times, but it is not known from what influence it was derived. It seems most probable that the simple repetitions, in which most primitive poetry abounds, form the basis from which rhyme naturally arises. Consult: Corson, *Primer of English Verse* (Boston, 1893); Gummere, *Handbook of Poetics* (Boston, 1895); Schipper, *Englische Metrik* (Bonn, 1881-88).

RHYNCHOCEPHALIA, rĭŋ'kō-sĕ-fā'lĭ-ȧ (Neo-Lat. nom. pl., from Gk. ῥύγχος, *rhynchos*, snout + κεφαλή, *kephalē*, head). An order of primitive reptiles, represented in modern times by a single survivor, Sphenodon or Hatteria, which lives on islands off the coast of New Zealand, and in ancient times by a large number of creatures whose fossil remains are found in Permian, Mesozoic, and Eocene rocks. This order received its name from the beak-like rostrum on the skulls of some of its typical species. It includes the earliest and most primitive reptiles, and also the birds. The suborder Proterosauria,



RHYNCHOCEPHALIA.

1, Skull of Palæohatteria, superior aspect; 2, the same, lateral aspect; 3, a dorsal vertebra of *Nassaurus claviger*: *c*, centrum; *j*, jugal; *m*, maxilla; *q*, quadrate bone.

or Proganosauria, includes the most primitive forms, in which the teeth are of uniform shape and parts of the skeleton are still cartilaginous. Palæohatteria from the Lower Permian of Saxony is the earliest known reptile. It had a lizard-like body about 18 inches long, with a long tail, large head, very large eyes, and numerous large conical teeth that are fused with the jaw bones, and also small teeth on the palate. The

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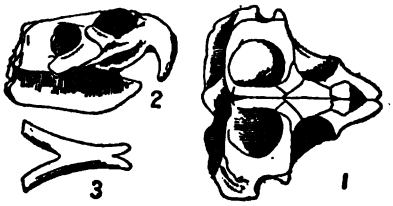
legs were strong and the feet were provided with five clawed toes and adapted to progress on land.

A suborder, Pelycosauria, includes several curious though imperfectly known genera in which the anterior teeth are different from the posterior and the dorsal vertebræ are furnished with greatly elongated neural spines. The *Rhynchocephalia vera* includes the most highly specialized forms, which attain their maximum of evolution and widest geographic distribution in late Triassic time. They are characterized by more complete ossification of the skeleton, by reduction of the abdominal ribs, and by having uniform marginal teeth.



THE RHYNCHOCEPHALIC SKULL.

Cranium of *Hyperodapedon Gordoni:* 1, superior aspect; 2, lateral aspect; 3, mandibular symphysis.

BIBLIOGRAPHY. Von Zittel and Eastman, *Textbook of Paleontology*, vol. ii. (London and New York, 1902).

RHYN'CHONEL'LA (Neo-Lat. nom. pl., from Gk. ῥύγχος, *rhynchos*, snout). A genus of brachiopods, scarce but widespread in modern seas, but very abundant anciently, and represented in almost every geological formation from the Ordovician upward. About 600 species have been described, mostly from the Mesozoic rocks, of which the Jurassic and Cretaceous groups are especially prolific. Most of the ancient forms are doubly convex shells with prominent though small ventral beaks, and with surfaces marked by strong, usually angular radial plications, and with a more or less elevated median fold and sinus. The structure of the shell in most genera is non-punctate, a character by which the species may most readily be distinguished from the closely similar species of Terebratulidæ. Consult: Hall and Clarke, *Paleontology of New York*, vol. viii., part ii. (Albany, 1894); Davidson, "Monograph of the Recent Brachiopoda," *Transactions of the Linnean Society*, vol. iv. (London, 1886-88).

RHYOLITE (from Gk. ῥύαξ, *rhyax*, stream, especially of lava, from ῥεῖν, *rhein*, to flow + λίθος, *lithos*, stone), LIPARITE, NEVADITE. An igneous rock of porphyritic texture and siliceous composition, generally with a crumply, banded (rhyolitic) texture, due to the arrangement of its constituent minerals by flowage. Rhyolites are also frequently glassy, vesicular, scoriaceous, or pumiceous. When compact and massive, rhyolites are designated as rhyolite porphyries (formerly called quartz porphyries, and then supposed to be of geological age older than the Tertiary). In chemical composition rhyolites have about the same range as the granites. They average: Silica, 75 per cent.; alumina, 13 per cent.; sesquioxide and protoxide of iron, each 1 per cent.; oxide of lime, 1 per cent.; oxide of sodium, 3 per cent.; oxide of potassium, 6 per cent. Varieties rich in oxide of sodium are designated soda-rhyolites (pantellerites). Rhyolites are for the most part surface lavas or are intruded in other rocks as dikes or sills. Very extensive areas of rhyolite are found in the Cordilleran mountain system of the Western Hemisphere. Rhyolites when of unusually coarse grain are now designated by the variety name, Nevadite.

RHYS, rēs, ERNEST (1859—). An English author, born in London, July 17, 1859. He was educated at schools in Carmarthen, South Wales, at Bishop-Stortford and at Newcastle-on-Tyne, and became a mining engineer (1877). In 1885 he abandoned the profession for general literature. In 1887 he came to the United States on a lecturing tour. His writings on Welsh subjects are popular and are to be distinguished from those of the profound Celtic scholar John Rhys (q.v.). He edited the Camelot series of popular reprints and translations (65 vols., 1886-91); Dekker's *Plays* for the Mermaid Series (1888); *The Lyric Poets* (12 vols., 1894-99); *Literary Pamphlets* (1897); and other works. His writings include: *The Great Cockney Tragedy* (1891); *A London Rose and Other Rhymes* (1894); *Welsh Ballads and Other Poems* (1898); *Frederick Lord Leighton*, a biography (1898, which had been preceded by an earlier study in 1895); and two romances, *The Fiddler of Carne*, having a Welsh heroine (1896), and *The Whistling Maid* (1900).

RHYS, JOHN (1840—). A Welsh author and professor of Celtic at Oxford since 1877. He was born in Cardiganshire in 1840 and educated at Bangor Normal College, Jesus College, Oxford, the Sorbonne, Heidelberg, and Leipzig. In 1871 he became school inspector for Flintshire and Denbighshire; fellow of Jesus College in 1881; Hibbert lecturer, 1886; Rhind lecturer on archæology in Edinburgh, 1889; and has seen service on numerous commissions on education, reforms and land movements connected with Wales. His works are: *Lectures on Welsh Philology* (1877); *Celtic Britain* (1882); *Celtic Heathendom* (1886); *Studies in the Arthurian Legend* (1891); *Inscriptions and Language of the Northern Picts* (1892); *Rhind Lectures on the Early Ethnology of the British Isles* (1890-91); *Celtic Folk-Lore* (1901); and in conjunction with Mr. D. Brynmor-Jones, *The Welsh People* (1900). Professor Rhys has also coöperated in the production of several important editions of Welsh texts and his contributions to Celtic scholarship have been various and important. To his native and unsurpassed knowledge of Wales and of the Welsh language he has added wide research in the other languages of the Celtic group, and in the history and antiquities of the Celtic peoples. Besides doing valuable linguistic work in early Welsh and Manx, he has made himself the chief living authority on the Ogam inscriptions. His studies on folk-lore, mythology, and religion have been learned and brilliant, but rather bold in conjecture. The editions of Welsh texts which he has brought out in collaboration with Professor Morris Jones and Mr. J. Gwenogvryn Evans are models of accurate editing.

RHYTHM (Lat. *rhythmus*, from Gk. ῥυθμός, *rhythmos*, rhythm, time, measure, from ῥεῖν, *rhein*, Skt. *sru*, to flow). A complex mental process which has been defined, from different points of view, as a temporal perception and as a regulated emotion. Objectively regarded, it is a regularly measured and regularly stressed movement in

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time. Regarded as perception, it is a series of auditory or tactual (never of visual) sensations, which recur at regular intervals and show a regular variation of intensity. In other words, our interpretation of rhythm as a perception simply translates the objective definition into subjective terms. There are, however, certain phenomena of the rhythmical consciousness which have led some psychologists to accept the other view, that rhythm is a kind of emotion. (1) If we subject an observer to a series of regularly recurring and similar sounds, we find (within definite time limits) that in the majority of cases the series is apprehended as rhythmical. The most familiar instance is that of listening to the ticking of a clock; the beats of the pendulum are heard, not as tick, tick, tick, but as *tick*, tick, *tick*, tick, etc. (2) We can produce the effect of rhythm not only by changing the objective intensity of regularly recurring stimuli, but also (*a*) by changing their duration, (*b*) by changing the interval between them, and (*c*) by changing their quality. That is to say, the intensities may remain constant throughout, and yet (if some one of these three variations is introduced into the series) the observer will have the illusion of intensive fluctuation, and will therefore be constrained to hear the series as rhythmical. (3) There is a strong tendency to 'express' rhythm, to accompany a series of rhythmical sounds by movements of head, foot, or hand.

RHYTHM IN MUSIC. The regular recurrence of tone-groups in which the individual notes are symmetrically arranged according to accent and time-value. Rhythm is entirely independent of melody or harmony (qq.v.) and can, therefore, be indicated by notes without reference to pitch. The following examples illustrate this:

Example 1.—POLONAISE. 3/4

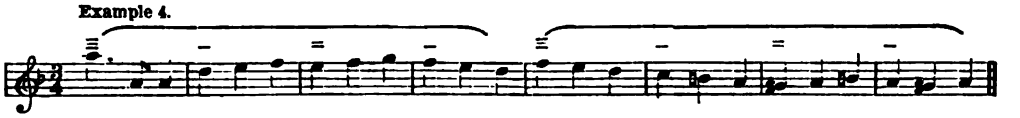
Example 2.—FANDANGO. 3/8

Example 3.—BEETHOVEN (Symphony No. 7). 6/8

In the first example the characteristic rhythmic figure is contained within the limits of a single measure; whereas in the other two examples it fills two measures. It is evident from this that rhythm is not synonymous with accent; for the first beat of every bar has an accent, while in examples 2 and 3, although every bar retains its own accent, there is no special accent or emphasis at the beginning of the rhythmic figure. Accent thus deals with the notes of a single measure; rhythm with groups of notes extending over one or (generally) more measures. Music becomes intelligible only when these larger rhythmic divisions are clearly grasped. A cultivated ear soon tires of constant regularity of rhythm. To avoid monotony, composers resort to various means of breaking the rhythm, such as inserting an odd bar between the regular number of bars composing a rhythmic group, alternating two-bar with three-bar rhythms, or making the weak ending of a phrase coincide with the strong beginning of a new phrase (thus really causing the elision of a bar).

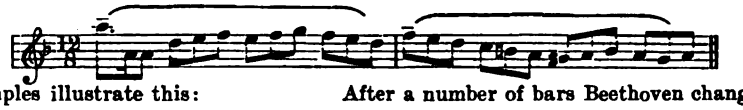
The only simple rhythms are those consisting of a group of notes filling two or three measures (duple and triple rhythm). All rhythms extending over more than three bars are compound. Thus every four-bar rhythm can be resolved into two groups of two bars each. A six-bar rhythm may consist of two groups of three bars each or three groups of two bars each. The Scherzo of Beethoven's *Ninth Symphony* (Ex. 4) begins with a theme in quadruple rhythm (two groups of duple rhythm).

Example 4.



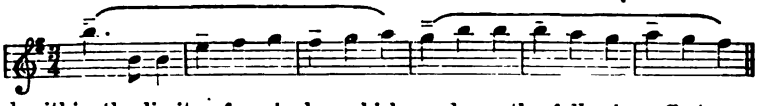
While every bar retains its own accent (marked —), there is a particular emphasis (marked ≡) upon the first and fifth bars (the beginnings of the rhythmic group) and a less emphasis (marked =) upon the third and sixth bars. The effect produced is the same as if the phrase were written in more moderate tempo as follows:

Example 5.



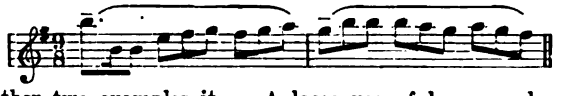
After a number of bars Beethoven changes this quadruple to triple rhythm:

Example 6.



which produces the following effect:

Example 7.



A loose use of language has created a great deal of confusion in regard to the meaning of the term rhythm. The word is often carelessly

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employed instead of *accent* or *time*, both of which terms are only subdivisions of rhythm. See ACCENT; SYNCOPATION; TIME.

RIAD, rē-äd′, or **RIYAD**. The Wahabi capital in the Sultanate of Nedjed, Central Arabia (Map: Turkey in Asia, R 11). It is built on an extensive open plain in a well-cultivated region. In the centre of the city is a large square containing the market-place and the great mosque. The city is a resting-place for pilgrims on the way from Persia to Mecca and Medina. Riad dates from 1824. Population (estimated), 30,000.

RIALL, rī′ăl, Sir PHINEAS (1775-1851). A British soldier. He was born in Ireland, entered the British Army as an ensign in 1794, and soon rose to be major. In 1804 he was attached to the Fifteenth Foot, served for several years with distinction in the West Indies, and in 1810 was brevetted colonel. Three years later he was promoted major-general, and was sent to Canada to operate against the forces of the United States. In the following winter he destroyed Black Rock, Buffalo, and other villages on the American border, and during the next summer commanded the troops which opposed the invading army under General Jacob Brown. On July 5th he was defeated in the battle of Street's Creek, or Chippewa. On July 25th at the battle of Lundy's Lane (q.v.), where he held the immediate command of the British forces, he was severely wounded and was taken prisoner. In 1816 he was appointed Governor of Grenada, and administered the affairs of that island for several years. He was promoted lieutenant-general in 1825, was knighted in 1833, and was made a full general in 1841. Consult Morgan, *Sketches of Celebrated Canadians and Persons Connected with Canadian History* (Quebec, 1862).

RIALTO, rē-äl′tō (It., from *rio*, *rivo*, brook + *alto*, deep, high). The chief bridge of Venice, a graceful structure spanning the Grand Canal by a single marble arch 74 feet in length, and 32 feet high. The name is derived from Rivoalto, the island on which Venice was founded. Two rows of shops divide the bridge into a broad road and two narrow side passages. The bridge and adjacent district are referred to in Shakespeare's *Merchant of Venice*.

RIANT, rē′äN′, PAUL EDOUARD DIDIER, Count (1836-88). A French scholar and historian, born in Paris. He was known as the foremost scholar of his day on the subject of the Crusades, possessed of a keen historical sense, skill in research, and marked scholarship in the interpretation of documents. In 1875 he founded the Société de l'Orient Latin, whose object was the publication of geographical and historical documents appertaining to the Crusades and Palestine. He collected an excellent library in the history of the Crusades, and in Scandinavian literature, of which Harvard University obtained the former portion, and Yale the latter. Among the numerous volumes written and edited by him are *Expéditions et pèlerinages des Scandinaves en Terre Sainte au temps des croisades* (1865); *Magistri Thadei Neapolitani Hystoria de Desolatione et Conculcatione Civitatis Acconensis 1291* (1874); and *Le changement de direction de la quatrième croisade* (1878). The *Catalogue de la bibliothèque de feu M. le comte Riant* appeared at Paris in 1896-99 (3 vols.).

RIAZAN, rē′ä-zän′y′. A government and a city of Russia. See RYAZAN.

RIB (AS. *ribb*, OHG. *rippi*, Ger. *Rippe;* connected with OChurch Slav. *rebro*, rib, and probably with Ger. *Rebe*, tendril, OHG. *hirnireba*, brain covering, skull). An elastic arch of bone, which, with its fellows, constitutes with the vertebral column behind, and the sternum or breastbone in front, the osseous part of the walls of the chest. In man there are 12 ribs on each side. The first seven are more directly connected through intervening cartilages with the sternum than the remainder, and hence they are termed *vertebro-sternal* or *true* ribs; while the other five are known as *false* ribs, and the last two of these, from being quite free at their anterior extremities, are termed *floating* ribs. A glance at a skeleton, or at a plate representing the articulated bones, will show that the ribs vary very considerably both in their direction and size. The upper ribs are nearly horizontal, but the others lie with the anterior extremity lower than the posterior, this obliquity increasing to the ninth rib, and then slightly decreasing. They in-

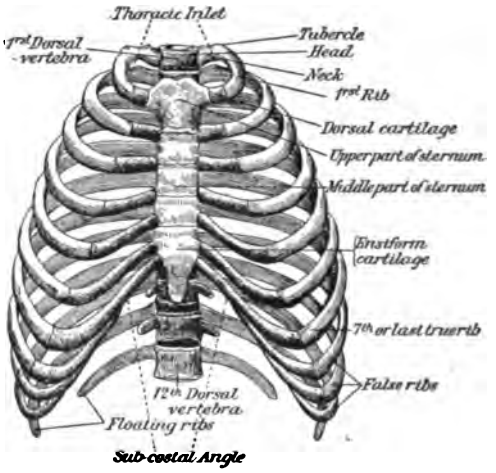

FIG. 1. THORAX, FRONT VIEW.

crease in length from the first to the seventh, and then again diminish. The spaces between the ribs are termed the *intercostal spaces*. On examining a rib taken from about the middle of the series, we find that it presents two extremities (a posterior or vertebral, and an anterior or sternal), and an intervening portion, termed the body or shaft. The posterior extremity presents a head, a neck, and a tuberosity. The head is marked by two concave articular surfaces divided by a ridge, the lower facet being the larger. These surfaces fit into the cavity formed by the junction of two contiguous dorsal vertebræ, and the ridge serves for the attachment of a ligament. The neck is a flattened portion proceeding from the head; it is about an inch long, and terminates at an eminence termed the tuberosity or tubercle, whence the shaft commences. On the lower surface of this tubercle is a small oval surface, which articulates with a corresponding surface on the upper part of the transverse process of the lower of the two contiguous vertebræ. The shaft presents an external convex and an internal concave surface. A little in front of the tubercle the rib is bent inward, and at the same time up-

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ward, the point where this bending takes place being called the angle. The upper border of the rib is thick and rounded, while the lower border is marked by a deep groove, which lodges the intercostal vessels and nerve.

The ribs of mammals are mostly connected, as in man, with the bodies of two vertebræ, and with the transverse processes of the posterior one. In the Monotremata, however, they articulate with the vertebral bodies only; while in the Cetacea the posterior ribs hang down from the transverse processes alone. Their number, on each side, corresponds with that of the dorsal vertebræ. The greatest number, 23, occurs in the two-toed sloth, while in the Cheiroptera 11 is the ordinary number. In birds each rib articulates by means of a small head with the body of a single vertebra near its anterior border, and with the corresponding transverse process by means of the tubercle. Moreover, each rib possesses a

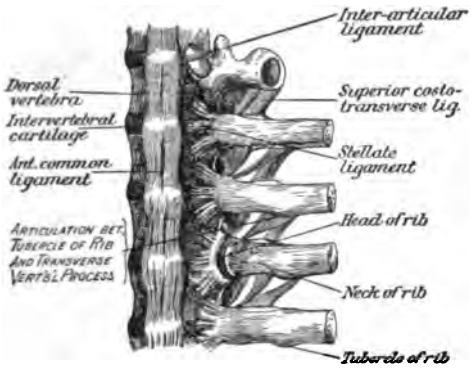

FIG. 2. ARTICULATION OF THE RIBS WITH THE SPINAL COLUMN, FRONT VIEW.

'diverging appendage,' which projects backward over the next rib, so as to increase the consolidation of the thoracic framework, necessary for flying. The dorsal vertebræ here never exceed 11, and are commonly 7 or 8 in number, and the ribs proceeding from them are connected with the sternum, not by cartilage, as in mammals, but by true osseous sternal ribs, which are regularly articulated at one end with the sternum, and at the other with the termination of the spinal ribs. In the chelonian reptiles the ribs (as well as the vertebræ and the sternum) deviate remarkably from the normal type, the lateral parts of the carapace consisting mainly of ankylosed ribs united by dermal plates. In the crocodiles there are only twelve pairs of true or dorsal ribs; while in the other saurians, and in the ophidians, the ribs are usually very numerous. In the frogs there are no true ribs, the reason probably being that any bony element in their thoracic walls would interfere with the enormous thoracico-abdominal enlargement which these animals periodically undergo at the breeding period. See SKELETON; SPINAL COLUMN.

RIB. In architecture, a projecting band or molding on an arched or flat ceiling. It is of universal use in all styles of Gothic architecture and it is the key-note of the Gothic system of construction. (See GOTHIC ARCHITECTURE.) Ribs were first used in certain Romanesque schools during the eleventh and early twelfth centuries, especially those of Lombardy, Normandy, and the Rhine. They simply followed the diagonal lines of intersection of two barrel vaults on a square plan. But the Gothic system, by using the pointed arch in the ribbing, by making a complete framework of diagonal, transverse, and longitudinal ribs, not only self-sufficient, but capable of sustaining weight and transmitting thrust, and by turning the shell of each vaulting compartment into a concave surface, made of the combination the basic unit of the structure. The ribs were at first heavy and simply molded, becoming in the thirteenth century more slender and elaborately molded. Their intersection at the crown of the vault was commonly decorated with carved ornamentation in the form of floral bosses or pendants. In late Gothic, especially in England and Germany, intermediate ribs of no constructive use were added in the vaulted fields for decorative effect, some of which were called *lierne*. The fan-tracery vaults and paneled vaults are two of the most elaborate of these styles of ribbing. Cusping and tracery were used in late Gothic ribbing, and the ribs often wandered in curved lines across the vaulting.

RIB, FRACTURE OF THE. A very common surgical accident, resulting usually from blows or falls upon the chest. It is not uncommon, however, for ribs to be broken by indirect violence, such as a crushing or squeezing force which springs the convexity of the ribs outward until fracture occurs. Instances are on record where the ribs of very old persons have been actually broken by very violent coughing.

The treatment for fractured ribs consists in the application of broad strips of adhesive plaster which encircle the chest wholly or in part and which by their pressure steady the broken fragments and prevent their moving upon one another in the act of respiration.

Where the sharp extremity of a broken rib penetrates the layers of the pleura and enters the lung and escape of air occurs from the lung substance into the pleura, and thence through the wound in the parietal layer of the pleura into the subcutaneous connective tissue, it is made evident by a puffiness of the skin and a peculiar crackling sensation to the touch. This condition, which is known as *surgical emphysema*, may extend over the entire trunk and occasionally has been known to invade nearly the entire body.

RIBAUT, rê'bô', or **RIBAULT, JEAN** (c.1520-65). A French navigator and colonizer, born at Dieppe. In 1562 he was given command of an expedition organized by the Huguenot leader, Admiral Coligny, which had for its object the founding of a Huguenot colony in America. With his two vessels he explored the Florida coast, and finally, anchoring at Port Royal, built Fort Charles, near the present Beaufort, S. C. Leaving twenty-six colonists, he went back to France, from which, on account of the civil wars, he was unable to return for some time. Meanwhile the colony had been abandoned. Another settlement of French Protestants, however, had been made in 1564 under Laudonnière at Fort Caroline, on the Saint John's River, and in August of the next year Ribaut came over with seven vessels and assumed command of the colony. The appearance of a Spanish squadron, which had been dispatched with orders to kill all the Protestants in the settlement, drove him to sea. He planned to attack the Spaniards in their new settlement at Saint Augustine, but his fleet was wrecked and

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the project was abandoned after a slight initial success. Meanwhile, the Spanish leader Menendez had taken Fort Caroline, on the Saint John's River, by rapid and skillful tactics. Over one hundred of the garrison were murdered by the Spaniards, as well as others of the French forces who later fell into the hands of Menendez. Ribaut traveling toward the settlement was met by Menendez, and with most of his party surrendered unconditionally. All but a few were put to death, Ribaut himself meeting his fate bravely. Consult: Winsor, *Narrative and Critical History of America*, vol. ii. (Boston, 1886); Parkman, *Pioneers of France in the New World* (ib., 1885); Gaffard, *La Floride française* (Paris, 1875).

RIB'BECK, Otto (1827-98). A German classical philologist. He was born in Erfurt, studied in Berlin under Lachmann, Böckh, and Bopp (1845), and in Bonn under Welcker, the 'last Hellene,' and with Ritschl, whose critical method he so closely followed. After receiving his degree in Berlin he went to Italy, where he spent a year. In 1853 he became a member of Böckh's seminar at Berlin, and from 1854 to 1877 taught successively at Elberfeld, Bern, Basel, Kiel, and Heidelberg. He became Ritschl's successor at Leipzig in 1877. Ribbeck's peculiar province was Latin poetry, and his great fame was as a bold textual critic. Besides many contributions to the *Rheinisches Museum*, of which he became an editor in 1876, his more typical works are the valuable collection of Latin comic and tragic fragments (1852-55; enlarged 1871-73; 3d ed. 1897-98); the text of Juvenal (1859), which is very radically reconstructed on the general principles of his essay, *Der echte und unechte Juvenal* (1865), in which Ribbeck held satires 1-9 and 11 as original and all else of the *textus receptus* late additions; the great text of Vergil (1859-62; prolegomena 1866), based on a minute study of the interrelations and history of the manuscripts, but marred by a subjective and fanciful, if brilliant, criticism, which is also to be found in the Horace of 1869; and an edition of Plautus's *Miles Gloriosus* (1881). But his most valuable works were the *Geschichte der römischen Dichtung* (1889-92; 2d ed. 1897-1900) and the masterly *Life* of Ritschl (1879-81). Mention should also be made of his series of classical character sketches, *Alazon* (1882), *Kolax* (1883), and *Agroikos* (1885), patterned somewhat on Theophrastus.

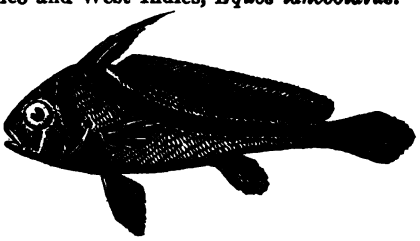
RIBBED VAULTING. A form of arched vaulting in which the masonry of the vault is sustained by ribs, which form a sort of skeleton, upon which the concave surfaces forming the shell of the vault rest. The ribbed vault is a development of the quadripartite groined vault, in which the groins are strengthened by means of ribs of masonry, but differs from it in that the concave surfaces of the vault are independent structures, transmitting the thrust to the ribs. (See Groined Vaulting.) For the different varieties of Ribbed Vaulting, see Vault. It is the basal unit of Gothic architecture, under which title its development is fully discussed.

RIBBON. See Silk.

RIBBON (OF. *riban, ruban, rubant*, Fr. *ruban;* perhaps connected with Ir. *ribin*, ribbon, Welsh *rhibin*, streak, Gael. *rib*, hair, rag). In heraldry (q.v.), a diminutive of the ordinary called the bend.

RIBBON-FISH. (1) Any of a variety of pelagic fishes characterized by a much elongated and compressed body, especially those of the suborder Tæniostomi, including three families, represented by very few species. They are of very delicate structure, with naked and silvery skin, a long dorsal fin often uniting with the tail-fin, a small mouth, and a protractile snout. They are widely distributed from polar to tropical seas, but are nowhere found in abundance, being deep-sea fishes, and mere occasional visitants of the coasts. Owing to the delicacy of their frame, perfect specimens are seldom obtained. Specimens 20 feet long with a depth of 12 inches and a thickness of only an inch or two have been taken. See Oarfish.

(2) One of the roncadors (q.v.) of the Gulf of Mexico and West Indies, *Eques lanceolatus*. Its



GULF RIBBON-FISH (*Eques lanceolatus*).

generic name is due to the long dorsal spines, suggesting a rider; and its common name to blackish-brown bands which curiously ornament its yellowish-gray body.

RIBBON GRASS. See Canary Grass.

RIBBONISM. The name given to a movement which originated in Ireland about 1808, and took the form of secret associations of Catholics banded together for the purpose of combating the activity of the Orangemen (q.v.), and known as Ribbon societies. The name was derived from the green ribbon which was the badge of the organization. The societies appeared chiefly in Armagh, Down, Antrim, Tyrone, and Fermanagh, and seem never to have gained a footing in the purely Catholic counties. The members of the Ribbon societies belonged almost exclusively to the poorest classes, and the religious purposes of the organization soon became merged with social and agrarian. The Catholic clergy seem consistently to have opposed the movement.

RIBBON SNAKE. One of the American garter-snakes (*Eutænia saurita*) common from Massachusetts to Louisiana, but rare west of the Alleghanies. It is a light chocolate brown above, with three yellow stripes and greenish below. The only peculiarity in its habits is its fondness for water. Two closely similar species are *Eutænia Sackenii* of Florida, which is clear olive with straw-colored stripes; and *Eutænia proxima*, of the Mississippi Valley and Texas, which is blackish brown, with dull yellow stripes. See Garter-Snake.

RIBEIRO, rē-bā'ro, Bernardim (c.1486-c.1550). A Portuguese poet, born at Torrão, in the Province of Alemtejo. There is little positive information about this poet. He was a gentlemen of the chamber at the Portuguese Court for several years, and there had an unfortunate love affair with a relative of the King, who is said by some to have been Donna Joana de Vilhena. His best known work is the pastoral

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romance *Menina e Moça* (1554), the correct title of which is *Saudedes* or *Tristezas*. It introduces his own love affair and a number of the personages of the Portuguese Court. Although very obscure and confused as to plot, it contains passages of descriptive beauty. The *Obras de Bernardim Ribeiro* were published in 1645, 1785, and 1852. The best modern edition is that of Dom Jose Pessanha, the *Menina e Moça* with a *Prefacio* (1891).

RIBEIRO-FERREIRA, fär-rā'ē-rä, THOMAZ ANTONIO (1831-1901). A Portuguese poet and statesman, born at Parada de Gonta, and educated for the bar at Coimbra. In 1870 he became secretary general of the Portuguese colonies. He received the Colonial portfolio in 1878, that of the Interior in 1881, in 1885 and in 1890 was Minister of Public Works, and in 1895 and 1896 served as Minister to Brazil. In prose he wrote for the press and published two volumes of travels, but he was best known as a poet, with a typically Portuguese languor and grace, but much patriotism withal, as in *Dissonancias* (1891). Earlier poems are: *Sons que passam* (1854) and *Vesperas* (1858), both lyric collections; *Don Jaime* (1861; 6th ed. 1880), a national epic; and *Delfina do mal* (1868; revised 1881), a narrative.

RIBERA, rē-bä'rä, JUSEPE DE, called LO SPAGNOLETTO (1588-1656). An historical painter and etcher, Spanish by birth and training, but one of the leading masters of the Neapolitan school and the greatest colorist of Italy in the seventeenth century. He was born at Jativa, Province of Valencia, January 12, 1588. First instructed by Ribalta at Valencia, he received most of his training and spent the greater part of his life in Italy. He studied after the works of the great masters in Rome, then especially after Correggio and the Venetians, from whom he derived his vivacity of color. He formed his style, however, chiefly after Caravaggio, of whom he seems to have been an independent follower, rather than a direct pupil. After years of vicissitude, he settled at Naples, where he secured a patron in the rich picture dealer Cortese, whose daughter he married. Like Caravaggio's pictures Ribera's exhibit a wild, extravagant fancy, but great vigor, and, although imbued with the darkness of shadow masses peculiar to the Neapolitan "Tenebrosi" (Darklings), they show a much finer instinct of the chiaroscuro. He delights in scenes of horror, such as tortures and martyrdoms of all kinds, but occasionally shows also poetic charm and was the first to combine realism with the Roman Catholic spirit. He painted numerous heads and half-figures of hermits, saints, and philosophers with great anatomical exactness. Especially good are his various representations of the "Martyrdom of Saint Bartholomew," examples of which are in the museums of Madrid, Berlin, and Dresden. Among his finest paintings are the "Immaculate Conception" (1635), in the Convent of the Augustine Recollets at Salamanca, excelling in splendor of color and light and in the charm of the Virgin's figure the representations of this subject by Murillo, Guido Reni, and Rubens; the "Descent from the Cross" (1637), admirable for its delineation of pain, and "Communion of the Apostles," both in San Martino, Naples; the "Adoration of the Shepherds" (1650), in the Louvre; the "Martyrdom of Saint Lawrence," in the Vatican; a "Pietà" in the National Gallery, London; and "Saint Mary of Egypt Praying at Her Grave" (1641), in the Dresden Museum, of exceptional charm in the expression of the head. Of the fifty pictures in the Madrid Museum, the best are: "Jacob's Dream;" "The Immaculate Conception;" "Isaac Blessing Jacob;" "Magdalen;" "Saint Rochus;" "Prometheus;" and "The Blind Sculptor of Gambazo." Of singular interest is a half-figure of "Homer, as Improviser with the Violin," in the Turin Gallery, and his latest work, the "Saint Sebastian" (1651), in the Museum of Naples. Of his twenty-six etchings the best-known are "The Drunken Silenus with Satyrs" (1628), the equestrian portrait of "Don Juan d'Austria" (1648), two of "Saint Jerome," and "Satyr Scourged by Cupid." Consult: Bermudez, *Diccionario histórico . . . de las bellas artes*, iv. (Madrid, 1800) Eisenmann, in Dohme, *Kunst und Künstler Italiens*, iii. (Leipzig, 1879); Woermann, in *Zeitschrift für bildende Kunst* (ib., 1890); and *Diccionario enciclopédico hispano-americano*, xvii. (Barcelona, 1895).

RIBHUS (Skt. *ṛbhu*, dexterous, from *rabh*, Gk. *λαμβάνειν*, *lambanein*, to take; ultimately connected with Ger. *Alp*, AS. *ælf*, Eng. *elf*). In Vedic mythology, a group of divine artificers. They are usually three in number, and were originally mortals. They are closely associated with Indra, and also with Savitar, the sun, while in their appearance they are like the sun, and ride in a bright car drawn by fat steeds. They are most frequently mentioned as the artisans of the gods. The physical basis of the divine aspect of the Ribhus is doubtful. Some scholars regard them as the three seasons which are at a standstill during the twelve days of the winter solstice. Consult: Nève, *Essai sur le mythe des Ṛibhavas* (Paris, 1847); Macdonell, *Vedic Mythology* (Strassburg, 1897); Ryder, *Die Ṛbhu's im Ṛgveda* (Gütersloh, 1901).

RIBOT, rē'bō', AUGUSTIN THÉODULE (1823-91). A French genre and portrait painter of the realistic school, born at Saint-Nicolas-d'Attez (Eure). He first painted mirror frames, and then worked for a while under Glaize and studied Chardin and the Dutch and Spanish masters in the Louvre. He began his exhibits at the Salon by a series of still-life pictures and kitchen scenes, painted broadly with strong Rembrandt-like effects of light and shade. These include "Cooks at Dinner Time" (1861), and "Chickens Roasting" (1861). His "Saint Sebastian" (1861) showed his powerful, if somewhat coarse, talent, in another manner. This picture, with "The Good Samaritan," and "Jesus in the Temple," is in the Luxembourg. His later works were mainly portrait heads, chiefly of old people, which are wonderful studies of wrinkled flesh and startling expression. He was decorated with the Legion of Honor. Consult Muther, *The History of Modern Painting* (New York, 1896).

RIBOT, ALEXANDRE FÉLIX JOSEPH (1842—). A French statesman, born in Saint Omer (Pas de Calais), and educated for the law in Paris. He was one of the founders of the Société de Législation Comparée, was for two years (1875-77) at the head of a department in the Ministry of Justice, and in 1878 was elected a Deputy.

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He became a member of the Left Centre, defended Dufaure's policy, and in his general conservatism was especially prominent as opposed to the colonial policy of the Ferry Cabinet. In 1890 he became foreign Minister in Freycinet's Cabinet, a portfolio which he also held under Loubet. From December 1892 to March 1893, he was president of the Cabinet, and on Faure's election, in 1895, was again called to form a Cabinet, which did not last the year out. After Fashoda, Ribot again urged his conservative colonial policy of prudent waiting. In the Dreyfus affair, although he had previously urged all possible publicity, he successfully opposed the prosecution of Mercier. Ribot made a special study of English politics, and in 1866 wrote a *Biographie de Lord Erskine.*

RIBOT, THÉODULE ARMAND (1839—). A French psychologist. He was born at Guingamp, December 18, 1839, and was educated at the Lycée de Saint Brieure and at the Ecole Normale, Paris, where he graduated in 1862, and whence he received a doctor's degree in 1875. After teaching for several years as professor of philosophy at various lycées, he came to Paris and turned to the investigation of experimental and physiological psychology in the histological and physiological laboratories and at the clinics of the insane asylums. In 1876 he founded the *Revue philosophique,* of which he became the editor. In 1885 he was given charge of a course in experimental psychology at the Sorbonne, and in 1888 was called to the chair of experimental and comparative psychology in the College of France. Ribot has taken a leading part in the recent development of psychology in France, adopting the best methods of both the German and the English psychologists, while at the same time his work has been characteristically French in breadth of view. Especially valuable have been his psychopathological studies and the analytical and comparative treatment of distinctive types or fields of mental phenomena in his later books. Best known are *La psychologie anglaise contemporaine* (1870; trans., London, 1873); *L'hérédité psychologique* (1873, 5th ed. 1889; trans., London, 1875); *Philosophie de Schopenhauer* (1874; 7th ed. 1896); *Psychologie allemande contemporaine* (1879, 13th ed. 1898; trans., New York, 1886); *Les maladies de la mémoire* (1881, 13th ed. 1898; trans., International Scientific Series, xli., New York, 1882); *Les maladies de la volonté* (1883, 14th ed. 1899; trans., New York, 1884); *Les maladies de la personnalité* (1885, 8th ed. 1899; trans., Chicago, 1895); *La psychologie de l'attention* (1889, 3d ed. 1897; trans., Chicago, 1896); *Psychologie des sentiments* (1896, 3d ed. 1899; trans., London, 1897); *L'évolution des idées générales* (1897; trans., Chicago, 1899); *Essai sur l'imagination créatrice* (1900).

RICARDO, rê-kär'dô, DAVID (1772-1823). An eminent English political economist, born in London. His father, a Jew from Holland, gave him an education in a commercial school in that country. When fourteen years of age Ricardo left school to engage in his father's business on the stock exchange, for which he showed remarkable aptitude. At nineteen he entered the Church of England and was renounced by his father. Thrown upon the world without resources, he set up as a broker, with such success that he was reckoned a man of wealth by the time he was twenty-five years of age. It was about this time that he was attracted to the works of Adam Smith, and he began to devote himself to economic studies, though he did not wholly withdraw from business life until 1818. His first publication on economic studies was a pamphlet issued in 1809, and entitled *The High Price of Bullion a Proof of the Depreciation of Bank Notes.* This work created considerable stir, and received, as it were, official confirmation in the famous Report of the Bullion Committee in 1811, in the drafting of which Ricardo is reported to have had great influence. A series of pamphlets on financial subjects followed this first venture, and in 1817 appeared his *Principles of Political Economy and Taxation,* on which his fame chiefly rests. In 1819 he entered the House of Commons, and while his diffidence prevented him from becoming a notable speaker, he maintained there a high authority upon all matters pertaining to finance and taxation until his death.

Ricardo exercised a greater influence upon economic thought than any other of the earlier writers except Adam Smith. His writings cover the fields of abstract theory, currency, taxation, and protection, in each of which he contributed much that was of permanent value. In economic theory his name is associated with the law of rent (q.v.), which he did not originate, but expounded so forcibly that it became generally known through his works; the so-called "iron law of wages," that wages in the long run cannot exceed the minimum of subsistence, for which he is, however, no more responsible than Adam Smith; the labor theory of value, according to which commodities tend to exchange in proportion to the quantity of labor that has been expended upon them. None of these theories receives unqualified acceptance at the present day, although existing theories have been profoundly influenced by them. His writings on taxation are abstract, and throw considerable light upon the problems of incidence of taxes. The most complete part of his work is his discussion of currency. His is the first adequate and clear statement of the quantity theory of money. (See MONEY.) The doctrine of comparative costs (see INTERNATIONAL TRADE) is one of his most important discoveries in the realm of international trade.

In addition to the works mentioned in the text, he was author of a large number of pamphlets on taxation, currency, and protection, and of numerous controversial letters to Malthus, J. B. Say, McCulloch, and other economists.

RICASOLI, rê-kä'zô-lê, BETTINO, Baron (1809-80). An Italian statesman, born at Florence. He was a descendant of an ancient Lombard family, studied at Pisa and Florence, and passed the early years of his life on his estate devoted to the study of agriculture, on which subject he wrote a number of useful works. In 1847 he appeared in politics as a leader of the Moderate Liberals and an advocate of Italian unity, and was elected Mayor of Florence. In 1849 as a member of the executive commission he was instrumental in recalling the Grand Duke Leopold, trusting to the constitutional promises given by the latter. Leopold returned accompanied by the Austrians, and Ricasoli, indignant at this treachery, retired into private life.

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In 1859 he assumed the leadership of the liberal movement in Tuscany, and after the flight of the Grand Duke was made dictator (August 1). In this office he exerted himself for the union of Tuscany with Sardinia. His firmness strengthened the hands of Cavour and Victor Emmanuel, and on the 20th of March, 1860, he was able to announce to the Tuscan assembly that its work was done. In the same month he was made Governor-General of Tuscany. On the death of Cavour (June, 1861) Ricasoli was called to the head of the Ministry. His Cabinet, however, could not withstand the Radical assault, and he resigned in March, 1862. He returned to power in June, 1866, and retired in April of the following year, when he was succeeded by Ratazzi. Consult his *Lettere e documenti* (10 vols., Florence, 1888-95); Ongaro, *Bettino Ricasoli* (Turin, 1861); Passerini, *Genealogia e storia della Famiglia Ricasoli* (Florence, 1861).

RICCI, rīt'chē, Federigo (1809-77). An Italian dramatic composer, born in Naples. He was educated in music at the Conservatory of San Sebastiano, after which he followed his older brother to Rome. His first great success was won by the opera *La prigione d'Edimburgo* (1837), which was followed by the scarcely less successful *Un duello sotto Richelieu* (1839); *Michelangelo e Rolla* (1841); and *Corrado d' Altamura*. In 1853 he went to Saint Petersburg as inspector of the vocal classes in the Theatre School, and about 1870 left that city to superintend personally his own musical productions in Paris. One or two of his operas had been translated and adapted for the French stage, and their success led him to bid for French favor with the more ambitious operas *Docteur Rose* (1872), and *Chi dura vince*. He was disappointed, however, and in 1876 returned to Italy. Additional compositions included masses, cantatas, songs, as well as several other operas. He died at Conegliano.

RICCI, Luigi (1805-59). An Italian dramatic composer. He was born in Naples, and, like his brother Federigo, was educated at the Conservatory of San Sebastiano, Naples. He composed several very successful operas which he presented in rapid succession, and in 1836 became maestro di capella at the Cathedral of Triest, and vocal director of the city theatre. After this much of his work was done in collaboration with his brother until 1859, when he was stricken with disease of the brain, and after confinement in the Prague asylum died there. He wrote about 30 operas, of which perhaps *La festa di Piedigrotta* (1852) and *Il diavolo a quattro* (1859), written jointly with his brother, are among the best. His masterpiece, however, was *Crispino e la Comare* (1850), one of the best comic operas of Italy and the only one still performed outside of it. Other compositions include masses, sacred and secular songs, and duets.

RICCI, Matteo (1553-1610). The founder of the Jesuit missions in China, and a celebrated astronomer, born at Macerata, Italy. After studying law at Rome he entered the Society of Jesus in 1571. In 1577, while still a scholastic, he went on the mission to India. There he was ordained, and because of his ability in Eastern languages, especially in Chinese, selected to found the mission in China. Ricci published several works in Chinese which attracted the attention of Chinese literati by the purity of their style. He resolved to make his way to Peking, and in the dress of a Chinese scholar succeeded in reaching Nanking (1595), but was not allowed to remain long. Later he wrote a series of didactic works in Chinese, one a *Dialogue of Friendship*, in imitation of Cicero, which so pleased the Chinese mandarins that he obtained the permission to go to Peking. He presented to the Emperor a telescope and various astronomical instruments, which were still in the palace when the Allies forced an entrance in 1900. After this he was allowed to reside at Nanking. In 1601 he obtained permission to build a church and found a mission in Peking itself. Before long his mathematical teaching and classical Chinese style obtained for him great prestige. He became a special favorite of the Emperor, and through his influence Christianity was introduced into the principal cities of China. There is an important work by him which contains a number of valuable observations on the geography and history of China. His book *On The Nature of God*, written in Chinese, has been admitted into the number of Chinese classics. Consult biographies by Sainte-Foi (Paris, 1859) and Werfer (2d ed., Regensburg, 1870).

RICCI, Scipione de (1741-1810). An Italian bishop, born at Florence. He was ordained a priest in 1766. For some time he was auditor to the Papal Nuncio at Florence, and in 1780 was appointed Bishop of Pistoja and Prato. He attempted to introduce certain reforms in the Church, but though he was supported by the Grand Duke Leopold, brother of Emperor Joseph II., and his reform measures were approved by the diocesan synod of Pistoja in 1786, he was opposed at the general Tuscan Synod, held at Florence in 1787. When Leopold left Tuscany, Ricci was forced by the anger of the populace to flee from Pistoja (April, 1790), and he formally renounced his episcopal dignity in June, 1791. Consult his *Life* by Potter (Brussels, 1825), and his autobiography, *Memorie* (Florence, 1865).

RICCI, Sebastiano (1659-1734). An Italian painter of the Venetian school, born at Cividale di Belluno. He was a pupil in Venice of Cervelli, with whom he painted in Milan, Bologna, and Venice. Afterwards he visited Austria and England, where he remained ten years. His works in England include the decorations of the chapel at Bulstrode for the Duke of Portland, of the hall at Burlington House, and those in the chapel of Chelsea Hospital. "The Continence of Scipio," and "The Dinner at Simon's House," two of his best productions, are at Hampton Court. He executed a large number of works distinguished for vivacity of conception, grace of form, and fine color.

RICCIARDELLI, rīt'chär-dĕl'lē, Daniele. See Volterra, Daniele da.

RICCIO, David. See Rizzio.

RICCIO, rīt'chō, Domenico, called Brusasorci (1494-1567). An Italian painter of the Venetian school, born in Verona. He was the pupil of Caroto, but was strongly influenced by Giorgione and Titian. Most of his works, chiefly frescoes, are to be found in his native city. Those which depict mythological subjects are better than his purely religious pieces. He painted the façade of the Casa Murari, now al-

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most destroyed, and "The Entry of Clement VII. and Charles V. into Bologna," in the Palazzo Ridolfi. This last, his most celebrated work, is notable for the dramatic expression of the figures and its fine color. Domenico's son FELICE (1540-1605), also called BRUSASORCI, studied under Ligozzi in Florence. A number of his religious paintings are in the Verona churches, and there is a "Holy Family" by him, in the Louvre. His style is refined, and his coloring rich and pleasing.

RICCOBONI, rĭk'kô-bō'nê, LODOVICO, called LELIO (1677-1753). An Italian dramaturgist, born at Modena. In 1699 he became director of a company of players, by whose aid he did away with the traditional Italian comedy of masks, and presented the *Pastor fido* and other dramas of importance. Opposition to him at Venice and in the Lombard towns caused him to withdraw to Paris, where from 1716 to 1729 he conducted an Italian theatre in the Hôtel de Bourgogne. He returned thence after a brief residence at Parma (1729-31). His publications include the *Histoire du théâtre italien* (1728-31).

RICCOBONI, MARIE JEANNE LABORAS DE MÉZIÈRES (1714-92). A French novelist, daughter-in-law of the preceding. She was born in Paris. She wrote the once popular novels of society, *Histoire du marquis de Crécy; Lettres de milady Catesby; Ernestine,* etc., but she is best known as the continuator of *Marianne,* by Marivaux (q.v.).

RICE (OF. *ris,* Fr. *riz,* from ML. *orysum,* Lat. *oryza,* from Gk. *ὄρυζα, oryza, ὄρυζον, oryzon,* rice; connected with Afghan *vrizi,* Skt. *vrihi,* rice). A genus of grasses of which the only important species is the common rice (*Oryzo sativa*), one of the most useful and extensively cultivated grains, supplying the principal food of one-half of the human race. It seems to have been originally a native of the East Indies, but has spread to all quarters of the globe, wherever the conditions of warmth and moisture are suitable. It is adapted to subtropical climates, rather than tropical or cold temperatures. Rice is an annual, varying from two to five feet in height. The seed or grain grows on little separate stalks, springing from the main stalk; and the whole appearance of the plant, when the grain is ripe, may be said to be intermediate between that of barley and oats. Rice requires a moist soil, artificially flooded at certain seasons. There are, however, varieties called upland rice that do not require flooding. The cultivation is most extensively carried on in India, China, and other southeastern parts of Asia, Japan, Egypt, the southern countries of Europe, South Carolina, Georgia, and the Gulf States of North America. The best of all rice known in the market is that of Carolina, yet the introduction of rice into that country occurred only about the end of the seventeenth or the first part of the eighteenth century. Rice is known in India as Paddy—a term also used to designate rice in the husk. See Plate of CEREALS.

In China, where, as in other warm countries, two crops may be obtained in a year, rice is generally sown thickly on very wet land, and afterwards transplanted to the land which it is finally to occupy. The plants tiller or spread at the root very much, so that each sends up several or many stalks. The rice-grounds are carefully weeded, although often so wet that the workmen may sink to their knees.

The origin of the regular production of rice in America is referred to the latter part of the seventeenth century, when a vessel from Madagascar is said to have brought a sack of the grain to Charleston, S. C. This yielded well, the culture spread, and eventually rice became the staple product of that State, until the War of the Rebellion checked it. The mode of cultivation best adapted to the plant in South Carolina has been found to be by irrigation, and it is chiefly grown where the land was formerly overflowed by the tides. The cultivation of rice spread rapidly to most of the Southern States, but of late years Louisiana and Texas have been the most successful in its cultivation. The prairies of the southern parts of the States have proved to be well suited to the cultivation of rice. The land is irrigated by pumping water from rivers and wells and so regulated as to permit of the use of machinery as in growing other small grains. The ground is plowed, harrowed, and rolled, and the seed planted with drills. The ground is allowed to dry sufficiently at harvest time to enable the use of binders and the grain is afterwards threshed with steam threshers. It is also grown on lowlands subject to overflow from the river, with due precautions against a possible crevasse. The water is conveyed by ditches and laterals, and is alternately turned on and drained off, as the condition of the plants' progress may demand. When mature the water is drained off, the grain cut and left to dry. After threshing, it is winnowed and placed in sacks, ready for the mill or market. The 'upland' rice is dry-cultivated, and is claimed by some planters to be better than the lowland. It is grown upon high and dry land, and, after the manner of other grain, the yield is not so generous as on the lowland. The milling of rice consists in removing the outer husk or coat. From the thresher the rice is sent to the mills in barrels holding 162 pounds each. From this quantity of rough rice, the mills secure 95 pounds of clean rice, 8 pounds of polish, 30 pounds of bran, and 29 pounds of waste. The rice polish and rice bran are mixed and sold as a feeding stuff under the name of rice feed or rice meal. It is very nutritious and is largely employed as a food for pigs.

The production of rice in the United States in 1899, as given in the Twelfth Census, was as follows:

	Pounds
Georgia	11,174,562
Louisiana	172,732,430
North Carolina	7,892,580
South Carolina	47,360,128
Texas	7,186,863

The amount did not supply the home market, and in addition 204,177,000 pounds were imported. The world's production of rice in 1899 was:

	Pounds
North America	283,722,627
Europe	1,507,368,000
Asia	72,386,748,000

Canada rice (*Zizania aquatica*), the wild rice of North America, is a species of a different genus of grass quite different from the true rice. It is particularly abundant in the Northwest, growing in miry places or shallow water, often in the margins of lakes. The seeds are about

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half an inch long, slender, farinaceous, affording very good meal, and used to some extent by the Indians where the plant abounds. Owing to its tendency to scatter its seed, its production has not reached any economic importance.

WILD RICE (*Zizania aquatica*).

Aside from its use as food (see below), rice is subjected to fermentation in many countries. The beer made from it (sake) is in general use among the Japanese. Several kinds of highly esteemed and very intoxicating wines are made from rice by the Chinese. A spirit is distilled from the lees. Rice starch is made in considerable quantity and is used in laundries and muslin factories. Rice straw is used to make bonnets and also to some extent as a feed for cattle.

FEEDING VALUE. The rice grain is not directly used as a food for farm animals. However, its by-products, chaff-meal, bran, and polish, are fed especially in regions where rice is grown. The straw also has a feeding value.

Rice bran and rice meal contain more or less of the germ, and are fed to dairy cows and pigs. According to recent experiments rice meal has practically the same value for pigs as corn meal when fed in addition to skim milk. Rice polish is a fine powder of high nutritive value and is very valuable for cows, pigs, etc. As it is rich in both nitrogen and potash, it produces a valuable manure. Rice hulls are too woody to be of much food value. They are largely used for packing around breakable articles. Unlike most cereal grains, rice is seldom made into bread or cakes, but is eaten boiled. In China, Japan, and other countries where the majority of the people cannot obtain animal food, rice, which is rather deficient in protein (see table), is supplemented by special products made from the soy bean (q.v.), which are rich in protein. In Europe and America rice is used as a vegetable and for making soups, puddings, cakes, etc.

Rice flour has the following percentage composition: Water, 8.5; protein, 8.6; fat, 6.1; nitrogen-free extract, 51.9; crude fibre, 16.1; and ash, 8.8. Flaked rice, a breakfast food, has the following average percentage composition: Water, 9.5; protein, 7.7; fat, 0.4; nitrogen-free extract, 81.7; crude fibre, 0.2; and ash, 0.3. Rice is believed to be very thoroughly digested. Judged both by palatability and wholesomeness, it is worthy of the high esteem in which it is held.

RICE, ALLEN THORNDIKE (1853-89). An American editor, born in Boston, Mass. He graduated at Oxford University in 1875, and in 1876 bought the *North American Review*, of which he subsequently became the editor. In 1879 he promoted the Charnay expedition, which, under the patronage of France and the United States, was sent to investigate the remains of primitive civilization in Central America and Mexico. He was the first to recommend the introduction into the United States of the Australian ballot system. He edited *Reminiscences of Abraham Lincoln* (1886) and was a contributor to *Ancient Cities of the New World* (1887).

RICE, DANIEL (1822-1900). An American circus-performer, born in New York City. Originally his name was McLaren. He became an acrobat, travelled as a circus-clown, and, after winning wide popularity, established a show of his own. He was also very successful financially and devoted considerable sums to charitable and public purposes. During the Civil War he promoted recruiting and subsequently delivered occasional lectures in favor of temperance. As a clown probably no other man, except perhaps George L. Fox, won such lasting recognition as did Rice.

RICE, JAMES (1843-82). An English novelist, born at Northampton, September 26, 1843. He studied at Queen's College, Cambridge, and was called to the bar at Lincoln's Inn (1871). Never taking very seriously to his profession, he gave most of his time to literature. As editor and proprietor of *Once a Week*, from 1868 to 1872, he made the acquaintance of Walter Besant, with whom he collaborated on several remarkable novels, as *Ready Money Mortiboy* (1872), which was successfully dramatized (1874); *The Golden Butterfly* (1876); *The Monks of Thelema* (1877); and *The Seamy Side* (1881). Besides these and other novels, they wrote in conjunction several Christmas stories for *All the Year Round* and the *World*. There had been no literary partnership so successful as this since that of Erckmann-Chatrian. Of the Besant-Rice collaborations perhaps *The Golden Butterfly* and *Ready Money Mortiboy* are the most vigorous. In exaggeration they show the influence of Dickens, but they are not lacking in real humor, sanity, and character drawing. Rice also wrote a gossipy *History of the British Turf* (1879).

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RICE, LUTHER (1783-1836). An American clergyman, born at Northborough, Mass. He graduated at Williams College in 1810 and, after studying theology at Andover Seminary, sailed for India as a missionary in 1812. Soon after his arrival he left the Congregationalists and joined the Baptists, as his friend Adoniram Judson had done a few weeks before. He soon returned to the United States and devoted himself to organizing missionary societies and raising funds among the Baptists. Largely through his efforts Columbian University, at Washington, was founded, and for many years he was its treasurer and devoted much energy to its welfare. Rice was a preacher of unusual power and left a deep impress on the Baptist denomination.

RICE, THOMAS D. (1808-60). An American comedian, born in New York City. He was apprenticed to a wood-carver, but was attracted to the theatre, where for a time he served as a supernumerary. Soon, however, he turned to negro minstrelsy, in which he became famous in both America and Great Britain. By many he is held to be without equal in his peculiar branch of comic acting. Among his popular performances were the burlesque tragedy *Othello*, the farces *Jumbo Jum* and *The Virginia Mammy*, and *Bone Squash Diavolo*, a travesty on *Fra Diavolo*. Many of his songs, such as "Lucy Long," "Jim Crow," and "Sich a Gittin' Up Stairs," held a place among the songs of the people in his day. At the height of his success Rice was noted for his eccentric extravagance, but he died in poverty.

RICE, WILLIAM NORTH (1845—). An American educator, born at Marblehead, Mass. He graduated at Wesleyan University in 1865 and received the degree of Ph.D. from Yale in 1867. From that year he was professor of geology at Wesleyan. He was an assistant to the United States Fish Commission in 1873-74, president of the American Society of Naturalists in 1891, and assistant geologist to the United States Geological Survey in 1891-92. He wrote: *Geology of Bermuda* (1884); *Science Teaching in the Schools* (1889), and *Twenty-five Years of Scientific Progress and Other Essays* (1894).

RICE-BIRD. The name in the Gulf States of the bobolink (q.v.).

RICE INSECTS. The rice weevil (*Calandra oryzæ*) is a cosmopolitan insect, which probably originated in India and has been diffused by commerce until it is found in most grain-growing countries. In the Southern United States it is known as 'black weevil.' It feeds upon the grain of rice, wheat, corn, barley, rye, oats, and sorghum, and also infests such breadstuffs as crackers and cakes, and is frequently found in flour and meal. It was originally bred from rice, whence its specific name; and it is amenable to the same bisulphide-of-carbon treatment ordinarily applied for other insects injuring stored grain. The rice grub of the Southern United States is the larva of a scarabæid beetle (*Chalepus trachypygus*), which looks like the ordinary white grub. It feeds upon the roots of upland rice, but in fields which are frequently overflowed it cannot exist. The so-called 'water weevil' (*Lissorhoptrus simplex*), however, does exist in overflowed fields.

The rice-stalk borer is the larva of a crambid moth (*Chilo plejadellus*). The moth lays its eggs in the early summer upon the rice stalks, and the young larvæ bore into the stalks, working their way gradually toward the roots. It transforms to the pupa stage within the stalk, and after five or six days the moth emerges. It is of a very pale yellowish or straw color, with golden fringes to the front wings, and expands about one inch. Stalks inhabited by the borer turn white, and this insect is responsible for a certain amount of the so-called 'white blast' of rice fields. The chinch bug (q.v.) also feeds upon the rice heads, but is seldom abundant enough to do much damage; while in the periods between the overflows the 'grass-worm' (larvæ of *Laphygma frugiperda*), when occurring in large numbers, may ravage a field. See GRASS-WORM.

Consult *Annual Report, United States Department of Agriculture* (Washington, 1881-82).

RICH, BARNABE (1540?-1620?). An Elizabethan writer. He served in the war with France (1557-58) and thereafter, through most of his life, with the army in Ireland. During his leisure he learned French and Italian and acquired a knowledge of the classics through translations. He claimed to have written thirty-six books, of which the best known is a series of short stories entitled *Riche his Farewell to Militarie Profession* (1581; reprinted by the Shakespeare Society, London, 1846). From this collection Shakespeare drew the plot of *Twelfth Night*. Afterwards Rich issued many romances in the style of the *Euphues*, military reminiscences, and pamphlets against the Papists and tobacco. Consult Jusserand, *The Novel in the Time of Shakespeare* (London and New York, 1890).

RICH, CLAUDIUS JAMES (1787-1827). An English traveler and Orientalist. He was born at Dijon, France, of English parents. His early years were spent in Bristol, where he was educated. He showed a remarkable aptitude for Oriental languages, and through friendly influence he received a cadetship in the East India Company service in 1803, but when his linguistic attainments became officially known he was transferred to the Bombay civil service as a writer. He was ordered to proceed via Egypt as secretary to the Consul-General to that country, but the vessel in which he traveled was burned in the Gulf of Rosas, Spain. He managed to escape, and, after many adventures in Malta, Italy, Constantinople, Smyrna, and the interior of Asia Minor, everywhere familiarizing himself with the vernaculars, he spent some time in Egypt. Disguised as a Mameluke, he traveled through Palestine and Syria, and, sailing from Basra, reached Bombay in 1807, where he was welcomed by the Governor, Sir James Mackintosh. Four months later he married the Governor's daughter and was appointed Resident at Bagdad, where he remained six years. He made a valuable collection of coins, gems, manuscripts, and material for a history of the region, in 1811 visited the site of Babylon, in 1813 sought recuperation from illness at Constantinople, and in 1814 journeyed through the Balkans and visited Vienna and Paris. After his return through Asia Minor to Bagdad, he revisited Babylon, and for his health traveled through Kurdistan in 1820. He definitely established the site of ancient Nineveh (q.v.). He died of cholera at Shiraz, in Persia, while assisting the sick. His published writings include two *Memoirs on The Ruins of Babylon* (1815 and

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1818), and *Narrative of a Residence in Koordistan and on the Site of Ancient Nineveh, with Journal of a Voyage Down the Tigris to Bagdad, and an Account of a Visit to Shiraz and Persepolis* (2 vols., 1836), edited with a biographical sketch by his widow. His Oriental collection was acquired by the British Museum.

RICH, EDMUND. An Archbishop of Canterbury. See EDMUND, SAINT.

RICH, JOHN (1682?-1761). A noted English harlequin and theatrical manager. His father, Christopher Rich, had been a manager of Drury Lane, and after the death of the elder Rich, in 1714, the son opened the new theatre in Lincoln's Inn Fields. It was in 1716 that he introduced the performances in which, under the name of Lun, he himself acted the part of Harlequin (q.v.). Before many years these had developed into the regular English pantomime (q.v.) and had become immensely popular. In 1732 he opened the theatre of Covent Garden, which he continued to manage till his death. In his harlequinades Rich combined an extraordinary agility and pantomimic gift with great ingenuity in devising novelties to attract the public. Consult Doran, *Annals of the Stage* (ed. Lowe, London, 1888).

RICH, PENELOPE, Lady (c.1562-1607). The object of the poetic passion of Sir Philip Sidney's sonnets addressed to 'Stella.' She was a daughter of the first Earl of Essex, who, together with his son Robert, Elizabeth's favorite, received kindly Sidney's offer of marriage. But her guardian, the Earl of Huntingdon, married her, probably in 1581, to Robert, Second Baron Rich, apparently against her will. The sonnets *Astrophil* and *Stella*, published after this marriage, sneer at the husband's lack of worth and of ability to appreciate her worth—an attitude toward Lord Rich which is also taken by Richard Barnfield, Bartholomew Yonge, and others who wrote poetry to Lady Penelope. But her marital unhappiness did not stop at this stage. In 1595, at the latest, she had formed a liaison with Lord Mountjoy, to whom she bore three sons and two daughters, and with whom, after Rich's abandonment of her, which did not occur until after the execution of her brother Robert (1601), she lived openly, even before her divorce in 1605. After her husband's remarriage she married Mountjoy, then Earl of Devonshire, and thus lost her standing at Court, where she had been a great favorite.

RICH'ARD I. (1157-99). Surnamed CŒUR DE LION, OR THE LION-HEARTED. King of England from 1189 to 1199. He was the third son of Henry II. and his Queen, Eleanor, and was born at Oxford, September 8, 1157. When a mere infant it was decided that he should inherit Aquitaine, and he was betrothed to Alice, or Alicia, the youngest daughter of Louis VII., King of France. Like his brothers, Richard on several occasions rebelled against his father, King Henry II., and was the most prominent figure in the final rebellion, which hastened the death of that monarch. Since the eldest son of Henry II. had died, in 1183, Richard succeeded to all the possessions of his father. He had taken the cross in 1187, on the news of the capture of Jerusalem by Saladin. Philip Augustus, King of France, had done likewise, and in 1190 both started on the Third Crusade. Richard, in order to prepare suitably for this Crusade, had borrowed and extorted money wherever possible. The administration of England during his absence was intrusted to William Longchamp (q.v.), but the prelate was opposed by the King's brother, John Lackland, who gradually usurped the government of the country.

The Crusade proved a failure almost from the start, chiefly on account of the lack of harmony between the two kings. After various delays Richard reached Messina on September 23, 1190. He tarried in Sicily more than half a year, and betrothed his nephew Arthur to the infant daughter of King Tancred. The Sicilian throne was at that time claimed by the Emperor Henry VI., and the alliance with Tancred, for this reason, afterwards turned out a very unlucky one for Richard. He fell out with the French King, refused to marry his sister Alice, and on April 10, 1191, sailed from Messina, carrying along with him Berengaria of Navarre, whom he married on May 12, 1191, in the Island of Cyprus, where he halted on his way to Palestine. The prodigies of personal valor which he performed in the Holy Land have made the name of Richard the Lion-Hearted famous in romance. After Acre had been captured, on July 12, 1191, Richard executed 2700 prisoners of war because the payment of their ransom was delayed. (See CRUSADE.) He quarreled bitterly with Philip Augustus, who went home. After spending months in indecisive contests against Saladin, Richard finally made a truce by which Jerusalem was left in the hands of the Sultan. On October 9, 1192, he set out on his return to England. As he was making his way through the dominions of Leopold, Duke of Austria, he was seized by that prince, who had been insulted by Richard while in the Holy Land, and was handed over to the Emperor Henry VI., who detained him as a captive.

John, meanwhile, ruled in England, and he and Philip of France had good reasons for wishing that Richard should never return to his kingdom. He was finally released, however, after paying a heavy ransom and agreeing to hold his kingdom as a fief of the Empire. On March 13, 1194, he found himself once more in England. His brother, John, who had acted so treacherously toward him, he magnanimously forgave, but with Philip Augustus he made war, while he left the actual government to the able administrator Hubert Walter (q.v.). He was on the whole victorious in his war against France, but was killed by an arrow shot from the Castle of Chaluz, which he was besieging, and died April 6, 1199. His character has generally been shown by modern historians in a very unfavorable light. Sismondi's words are often quoted: "A bad son, a bad brother, a bad husband, and a bad king." This estimate is somewhat unjust to Richard. He was extremely generous to John; there is no trustworthy evidence that he was a bad husband; as King he chose able ministers and left most of the ruling to them. But he did tax England heavily for his expeditions. He was a poet and well versed in the knightly accomplishments of his age. In the succeeding century he became the hero of many legendary tales, and he has always been viewed in popular literature as a hero of romance. Consult: Stubbs, *Constitutional History of England*, vol. i. (6th

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ed., Oxford, 1897); Round, *Feudal England* (London, 1895); Norgate, *Angevin Kings* (2 vols., ib., 1887); Stubbs, *Early Plantagenets* (5th ed., ib., 1886); Toeche, *Heinrich VI.* (Leipzig, 1867); Archer, *Crusade of Richard I.* (New York, 1889); Bloch, *Forschungen zur Politik Kaiser Heinrich VI.* (Berlin, 1892). Sir Walter Scott, in *Ivanhoe* and *The Talisman*, has used some of the best-known legends.

RICHARD II. (1367-1400). King of England from 1377 to 1399. He was the second son of Edward, the Black Prince, and Joan of Kent, and was born at Bordeaux on January 6, 1367. Many miraculous stories arose in time concerning his birth, due chiefly to his subsequent unfortunate career. Richard's elder brother died in 1371, and his father in 1376, so that he was placed in the care of his uncle John of Gaunt (q.v.). On June 21, 1377, Edward III. died and left to the infant King a country devastated by plague and a people oppressed by heavy taxes due to the war with France (q.v.). Parliament, which had obtained greater power in the last years of Edward III.'s reign, sought now to secure control of the government, but was opposed by John of Gaunt and his followers. In 1381 took place the Tyler Insurrection (q.v.), which was caused by an onerous capitation tax. The speedy suppression of this dangerous rising was due to a considerable extent to Richard's spirit and daring. In 1382 Richard was married to Anne of Bohemia, and in the same year the King began to seek the downfall of the great nobles, who controlled Parliament and prevented the development of the royal power. The next two years were occupied by a war with France, with which country Scotland was allied. For a while Richard conducted the war in Scotland in person, and Edinburgh was burned. In the absence of John of Gaunt in Spain, Richard's youngest uncle, the Duke of Gloucester, put himself at the head of affairs; and an attempt which Richard made to free himself from control having been defeated, several of his counselors were put to death, which act was approved by the Parliament of 1388. In 1389, however, Richard, by a coup d'état, succeeded in throwing off the yoke. Gloucester, Warwick, and Arundel were deprived of their power. These three nobles, together with Henry, Earl of Derby, eldest son of John of Gaunt, and Thomas Mowbray, Earl of Nottingham, had been the nobles who had 'appealed' or accused Richard's adherents in 1388. Hence they are known in history as the 'lords appellant.' In 1394 Richard went to Ireland and received the submission of the four 'Kings' of Meath, Thomond, Leinster, and Connaught.

The same year the Queen died, and in 1396 a marriage treaty was concluded between Richard and Isabella, infant daughter of King Charles VI. of France. Gloucester disapproving of this marriage, which seems to have been unpopular, Richard caused him to be privately arrested, and conveyed to Calais, where he either died or was murdered. On the meeting of Parliament, the Earl of Warwick was banished, and the Earl of Arundel beheaded. A misunderstanding having taken place between Henry, Duke of Hereford (formerly Earl of Derby), and Mowbray, Duke of Norfolk (formerly Earl of Nottingham), the King, desirous to be rid of both, sent the former into banishment for ten years, and the latter for life. But Hereford had been assiduously cultivating the popularity which his cousin had been as assiduously throwing away, and the result became apparent in 1399. On his return, in that year, from a military expedition in Ireland, Richard found that Bolingbroke (as Hereford was generally known) had, in his absence, landed in England, that he had placed himself at the head of a formidable army, and that the Duke of York had yielded and gone over to his side. The army which the King had with him in Ireland, also, no sooner landed than it almost entirely passed over to the invader. Meeting the conqueror at Flint Castle, Richard was carried captive in his train to London. On September 29, 1399, he formally resigned his crown. On the following day the resignation was ratified by Parliament, and the crown conferred on Bolingbroke (who had assumed the title of Duke of Lancaster), who was henceforth known as Henry IV. (q.v.). By order of the peers, Richard was confined secretly in various castles. In the February following his resignation, the nation was told that he was dead, and his body, or what was supposed to be it, was brought with much pomp from Pontefract Castle, and shown to the people. There were rumors afterwards of his being alive and in Scotland. It is probable that he was murdered about February 14, 1400. Richard had ability, but was very extravagant, fond of pleasure, and subject to fits of passion. He had some taste for literature and was a patron of Gower, Froissart, and Chaucer. His reign is important on account of the development of the Privy Council (q.v.) and the active rôle played by Parliament. Furthermore it was during this reign that the work of Wiclif (q.v.) bore fruit in the rise of the Lollard (q.v.) movement. Consult: Wallon, *Richard II.* (2 vols., Paris, 1864); Stubbs, *Constitutional History*, vol. ii. (4th ed., Oxford, 1896); Pauli, *Geschichte Englands* (Gotha, 1853-58).

RICHARD III. (1452-85). King of England from 1483 to 1485. He was the youngest son of Richard, Duke of York, and was born at Fotheringay Castle on October 2, 1452. His boyhood was passed amid the struggles of the Wars of the Roses, in which he experienced both imprisonment and exile. In 1461, after the accession of his brother Edward IV. to the throne, he was made Duke of Gloucester, although but a lad of nine years, and throughout the Wars of the Roses he remained faithful to his brother, rendering him most valuable assistance. He rejected the overtures of Warwick, and shared Edward's exile in 1470-71, and in the latter year he commanded the vanguard of the Yorkist's army at the final victories of Barnet and Tewkesbury. For all these services he was richly rewarded. In 1469 he was made High Constable of England, and in 1478 Great Chamberlain, besides receiving numerous other grants and offices. He stood highest in the royal councils, proving a capable statesman, and in 1480-82 he conducted successful campaigns against the Scots, and as Warden of the West Marches he brought that country into such subjection that the Parliament of 1483 granted this office to him and his heirs forever.

Upon his death in the same year Edward IV. left to Richard the care of his heir, Edward V., then but thirteen years old, and the administration of his kingdom. Richard was at the

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time in the north, but before his arrival at London he was recognized by the royal council as Protector of the realm. He soon overthrew the unpopular party of the Woodvilles, the Queen's relatives, who aimed to control the Government, and finally imprisoned Edward V. and his younger brother. Parliament thereupon declared that he was the rightful King, on the ground that Edward IV.'s marriage with Elizabeth Woodville was illegal. A deputation of lords and commons presented these conclusions to Richard, who assumed the crown on June 26, 1483. After his accession the King courted popularity with considerable success. He made a royal progress through the midland and northern counties, and was everywhere received with joy and loyalty. While Richard was thus engaged in the north, plots for the rescue of the captive princes were being hatched in the south, and to end these conspiracies Richard about this time probably had his prisoners put to death. The Duke of Buckingham, who was involved in these plots, thereupon planned a rebellion in favor of the Earl of Richmond, the Lancastrian claimant of the throne. A general uprising was planned for October 18th, which was to extend throughout Southern England and Wales, but the King's adherents repressed the insurrection in the south and cut the bridges over the Severn. The heavy autumn rains prevented Buckingham from crossing the river from the Welsh side, and the same storms frustrated the intended invasion by Richmond. Buckingham was taken prisoner and executed.

The remainder of Richard's brief reign was spent in preparations for the final struggle with Lancaster. By wise laws and politic acts he sought to win the affections of the people, and by extensive military preparations to baffle the expected invasion. In order to unite the Yorkist party, Richard intended to marry his son and heir to Elizabeth, the eldest daughter of Edward IV., and on the death of his son he proposed marrying her himself, but was obliged to renounce this plan on account of popular opposition. On August 7, 1485, the Earl of Richmond landed at Milford Haven, and was joined by the Welsh chieftains in his advance on Shrewsbury. Richard hastened to meet him, and the hostile armies faced each other on Bosworth Field. When, however, Richard ordered the attack he found his troops half-hearted, and the Stanleys, whom he had summoned to his aid from Lancastershire, joined the enemy. The result was that Richard was defeated and slain (August 22, 1485), and the Earl of Richmond became King of England as Henry VII.

There has been much discussion over the character of Richard III. The chroniclers of the following reign, from whom we have derived our knowledge of him, wrote to please the Tudors. They pictured him as a monster, both physically and morally, and the genius of Shakespeare has fixed this conception in the public mind. He is said to have been undersized and a hunchback, with his left shoulder lower than the right. His look was said by Polydore Virgil to be full of malice and deceit, and by Sir Thomas More to be warlike and hard-favored. But contemporary portraits, of which several survive, show a thoughtful, anxious face, and no trace of deformity. A hunchback could not have performed the feats of valor which he accomplished at Barnet, Tewkesbury, and Bosworth. But of his unscrupulous character there can be no doubt, although many of the accusations of his enemies are unfounded. He and his brother Clarence were said to have caused the death of Edward, the heir of the House of Lancaster, after the battle of Tewkesbury. But even if this be true there were many similar executions in the Wars of the Roses. There is nothing to prove that he caused the murder of Henry VI., or had any part in the accusation and conviction of his brother Clarence. From all these deaths Edward IV., and not Richard, was chief beneficiary. The murder of his two nephews in the Tower was, however, quite generally ascribed to Richard's orders, and probably with more reason. But of the supposed murder of his wife there is little likelihood. Whatever his moral character, he was certainly a ruler of great ability. His management of the Scotch war and his government of the north before his accession to the throne brought him the greatest popularity, and his legislation after his accession to the throne was wise and beneficent.

BIBLIOGRAPHY. *Letters and Papers of the Reigns of Richard III. and Henry VII.*, ed. James Gairdner (Rolls Series, 1861-63), which are the most important of the sources. Among the Tudor historians, consult: More, *History of King Richard III.* (new ed., Cambridge, 1933); Virgil, *Anglicæ Historiarum Libri XXVII.* (new ed., Leyden, 1861); Fabyan, *The New Chronicles of England and France* (London, 1811); Ross, *Historia Regum Angliæ* (Oxford, 1716). The best modern account of his reign is by Gairdner, *Life and Reign of Richard III.* (Cambridge, 1898). The most elaborate defense of Richard's character is Legge, *The Unpopular King: Life of Richard III.* (London, 1835). The question of the murder of the princes was discussed by Markham in the *English Historical Review*, vol. vi. (London, 1891), who believed Henry VII. committed the deed. He was answered by Gairdner in the same periodical and same volume.

RICHARD II. An historical tragedy by Shakespeare, written probably in 1595, and entered on the *Stationers' Register* in 1597. Excepting the adapted plays on Henry VI., it is the earliest of the historical plays, and the first printed. It was probably the play acted the night before Essex's rebellion in 1601. The suggestive deposition scene made it unpopular at Court, and it was suppressed by the censorship, being first printed in the Fourth Quarto in 1608. Several older plays on Richard II. had been written, but were not used by Shakespeare. The chief source of the tragedy was Holinshed's *Chronicle*, and its model was Marlowe's *Edward II.* Among the historical plays, it stands as a prologue to the dramas of Henry IV. and V.

RICHARD III. An historical tragedy by Shakespeare, written about 1595, and entered in the *Stationers' Register* in 1597, shortly after *Richard II.* An older play, *The True Tragedy of Richard III.*, was published in 1594, but from this Shakespeare took only two lines. He followed Holinshed's *Chronicle* (1577), who took the sombre picture of Richard from Sir Thomas More's *History of Richard III.* Traces of a weaker hand can be detected, and it is supposed that Marlowe helped in the early part of the play, which was finished and later revised by Shakespeare. Historically it follows closely on

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Henry VI. and completes the series dealing with the Wars of the Roses.

RICHARD, Earl of Cornwall (1209-72). King of the Romans (of Germany) from 1257 to 1272. He was the second son of King John of England by Isabella of Angoulême. In 1225 he was created Earl of Cornwall by his brother Henry III. In the same year he led a successful expedition into Gascony. In 1240 he went on a crusade, but accomplished little because hindered by lack of support from the military orders. He received many grants from the King at various times, and amassed enormous wealth, mainly through the possession of the tin mines of Cornwall, which gave him great power in political matters. In 1253 and 1254 he was Regent of England. (See Henry III.) In 1257 Richard was elected by some of the German princes King of Germany, Alfonso X. of Castile (q.v.) being elected by a rival party. Richard was crowned at Aix-la-Chapelle. He gradually won recognition throughout the Rhineland, but not elsewhere. In 1259 he was forced to return home to raise money, and took an oath to observe the Provisions of Oxford (q.v.). In the great struggle which took place between Henry III. and his nobles, Richard at first acted the part of a mediator; subsequently, however, he took a decided part with his brother against the party which was headed by Simon de Montfort, and on May 14, 1264, he was taken prisoner by that leader at the battle of Lewes. Montfort shut him up in Kenilworth Castle, from which he was released after the battle of Evesham in 1265. The murder of his eldest son, Henry of Almaine, by the son of Simon de Montfort, hastened his death, which occurred on April 2, 1272. Consult: Koch, *Richard von Cornwall, 1209-57* (Strassburg, 1888); Lorenz, *Deutsche Geschichte im 13. und 14. Jahrhundert* (Vienna, 1863-67); Schirrmacher, *Die letzten Hohenstaufen* (Göttingen, 1871).

RICHARD DE BU'RY. See Bury, Richard de.

RICHARD OF CIRENCESTER (1335?-1401?). An early English chronicler. Little is known of his life. He was probably born about 1335, and in 1355 was a monk in the Benedictine monastery of Saint Peter's, Westminster, where he spent his life, and died in 1400 or 1401. He devoted himself to the study of early British and Anglo-Saxon history and antiquities, and is said to have visited many libraries and ecclesiastical establishments in England in the prosecution of his investigations. In 1391 he obtained a license from his abbot to make a pilgrimage to Jerusalem. Richard's principal work is the *Speculum Historiale de Gestis Regum Angliæ*, in four books, covering the period 447-1066. It is a compilation and not very carefully done. Consult the edition from the copy in the public library, Cambridge, by Mayer in the *Rolls Series* (2 vols., London, 1863-69). A treatise on the ancient State of Great Britain, *Ricardus Corinensis de Situ Britanniæ* (Copenhagen, 1757), was long accepted as a genuine work of Richard, but is now conceded to have been a forgery by Charles Bertram.

RICHARD OF SAINT VICTOR (?-1173?). A scholastic and mystical theologian, born in Scotland. He entered the cloister of the Augustinian canons of Saint Victor, near Paris, under its first abbot, who died in 1155, and rose to be prior in 1162. His numerous writings, collected in Migne, *Patrologia Latina*, cxcvi., may be divided into exegetical (in which he follows the allegorical and mystical interpretation), dogmatic, and miscellaneous. In the second the masterpiece is the six books on the Trinity; in the third appear his letters. Like other mystics, he considers divine grace as the ultimate source of knowledge, and the highest object of study is God Himself. Consult: J. B. Haurêau, *Histoire de la philosophie scholastique* (Paris, 1872-80); Kaulich, *Die Lehren des Hugo und Richard von Saint Victor* (Prague, 1864).

RICH'ARDS, Brinley (1817-85). A British pianist and composer, born at Carmarthen, Wales. A student at the Royal Academy of Music, London, he won the King's scholarship there in 1835 and in 1837, and soon became known as a lecturer on Welsh music, and as a pianist. He taught in the Royal Academy, and composed an orchestral overture which was performed in Paris in 1840, and in London the following year; supplementary songs for the English production of Auber's *Crown Diamonds* (1846), besides pianoforte pieces, part-songs, and sacred solos.

RICHARDS, Ellen Henrietta (Swallow) (1842—). An American sanitary chemist, born at Dunstable, Mass. She studied at Vassar (1867-70), and then entered the Massachusetts Institute of Technology as a special student. In 1875 she married Robert Hallowell Richards (q.v.), and in 1884 she was appointed instructor in sanitary chemistry in the Institute of Technology. She wrote: *Chemistry of Cooking and Cleaning* (1882); *Food Materials and Their Adulterations* (1886); *Home Sanitation* (1887, with Talbot); *The Cost of Living* (1899); and *Air, Water, and Food* (1900).

RICHARDS, Joseph William (1864—). An American metallurgist, born in Oldbury, England. He graduated at Lehigh University in 1886, and returned there, after courses in Heidelberg and Freiburg, as assistant professor of mineralogy and metallurgy. He was a member of the United States Assay Commission in 1897, and attained prominence as a legal expert in chemical and metallurgical cases. He wrote *Aluminum* (1887).

RICHARDS, Robert Hallowell (1844—). An American mining engineer and metallurgist. He was born at Gardiner, Maine, graduated at the Massachusetts Institute of Technology in 1868, and in 1871 was appointed its professor of mining and metallurgy. Richards built up the laboratories in these two courses; invented jet pumps for use in physical and chemical laboratories (1873), and ore separators for Lake Superior copper (1881) and Virginia iron. In 1901 he published *Ore Dressing*.

RICHARDS, Theodore William (1868—). An American chemist, born in Germantown, Pa., a son of the artist William Trost Richards (q.v.). He was educated at Haverford College and at Harvard, where, after studies in Germany, he became assistant professor of chemistry in 1894. Richards was a member of the National Academy of Sciences and a special student of the atomic weights of the metals.

RICHARDS, Thomas Addison (1820-1900). An American landscape painter, born in London.

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He came to the United States in 1831 with his parents, who first settled in Georgia. They removed to New York City in 1845, where Richards afterwards lived, and where he studied at the National Academy of Design. In 1858 he was made director of the Cooper Union School of Design for Women, and in 1867 became professor of art in the University of New York. He was elected to the National Academy of Art in 1851. He was also known as an illustrator, and wrote several works on art, and some illustrated handbooks of travel.

RICHARDS, William (1792-1847). An American missionary. He was born at Plainfield, Mass., graduated at Williams College in 1819, and passed to the Theological Seminary at Andover. In 1822 he was sent as a missionary to the Sandwich Islands, and by the close of 1830 the native church numbered nearly 300 communicants. In 1838 Mr. Richards added to his regular religious duties the offices of interpreter, translator, and chaplain to the King. He visited England and several other foreign courts as special ambassador, and after his return in 1845 became Minister of Public Instruction, having care of all schools, Catholic and Protestant, and occupying a seat in the King's Privy Council. Consult Sprague, *Annals of the American Pulpit* (New York, 1866).

RICHARDS, William Trost (1833—). An American landscape and marine painter, born in Philadelphia. He was a pupil of Weber, in his native city, and afterwards traveled and studied in Europe. He exhibited at the Royal Academy and the Salon, and became an honorary member of the Academy of Design. His marine pictures are especially popular, and he is a skillful, if somewhat monotonous, painter of water. His works include: "On the Coast of New Jersey" (1883), in the Corcoran Gallery, Washington; and "The Bell Buoy," in the Pennsylvania Academy of Fine Arts. There are also several of his landscapes and marines in the Metropolitan Museum of Art, in New York City.

RICH'ARDSON, Sir Benjamin Ward (1828-96). An English physician and author. He was born at Somerby, in Leicestershire, and was early apprenticed to the surgeon of his native town. In 1850 he became a licentiate of the Faculty of Physicians and Surgeons of Glasgow, and later received the degrees of A.M. and M.D. at Saint Andrews. He devoted his attention particularly to sanitary matters and to methods of alleviating pain, for the latter object introducing at least 14 anæsthetics, including methylene bichloride and the use of ether spray. For his services in this direction he was knighted in 1893. Among his numerous works, which are by no means confined to medical subjects, are *The Health of Nations* (1887) and *National Health* (1890).

RICHARDSON, Charles (1775-1865). An English lexicographer. He studied law, but he early gave up that profession. For many years he kept a school at Clapham, near London. This he gave up in 1827 to devote himself wholly to the study of language. In 1853 he was granted a civil list pension of £75 a year. As a philologist he was a follower of Horne Tooke (q.v.). In 1818 he contributed to the *Encyclopædia Metropolitana* the first parts of an English lexicon, afterwards enlarged to the *New English Dictionary* (pub. in 30 parts, 1835-37; supplement added in 1856), long the standard English dictionary for England. It also had a wide sale in the United States. Though about as faulty as a dictionary could be, it has furnished better-equipped lexicographers with many quotations. An abridged edition appeared in 1839. Richardson also published: *Illustrations to English Philology* (1815); *On the Study of Language* (1854); and other books on language. He contributed to the *Gentleman's Magazine* and *Notes and Queries*. Richardson was sharply criticised by Noah Webster in *Mistakes and Corrections* (1837).

RICHARDSON, Charles Francis (1851—). An American literary critic and historian. He graduated at Dartmouth College in 1871, was on the editorial staff of the *Independent* (1872-78) and the *Sunday-School Times* (1878-80), editor of *Good Literature* (1880-82), and afterwards professor of English in Dartmouth College. His books include: *A Primer of American Literature* (1876); *The Cross*, a volume of poems (1879); *The Choice of Books* (1881); and an elaborate account of *American Literature* (1887-88). In 1902 he edited the Arnheim edition of Poe's works.

RICHARDSON, Clifford (1856—). An American chemist, born at Worcester, Mass. He graduated at Harvard in 1877. As assistant chemist to the United States Department of Agriculture (1878-87) and as inspector of asphalts and cements in the engineering department at Washington, he wrote Government reports on cereals (1883-86), on spices and condiments (1887), and on asphaltum (1894). He became a member of the Association of Official Agricultural Chemists, and contributed to the *Proceedings* of that body. In 1896 he was appointed superintendent of tests to the Barber Asphalt Paving Company, of Long Island City, N. Y.

RICHARDSON, Ernest Cushing (1860—). An American librarian and author, born at Woburn, Mass. He graduated at Amherst in 1880, pursued special courses at Washington and Jefferson College, and studied theology at the Hartford Theological Seminary, where he taught and was librarian from 1883 until 1890, when he was appointed librarian at Princeton. He was chosen vice-president of the American Library Association, contributed to Barner's *Jahresberichte der Geschichtswissenschaft*, edited *Hieronymus und Gennadius de Viris Inlustribus* (1896), and wrote *Influence of the Golden Legend on the Culture-History of the Middle Ages* (1887); *Faust and the Clementine Recognitions* (1894); and other works upon historical and literary subjects, besides numerous articles of interest to specialists in library work. His lectures before the New York State Library School Association were published in 1901 under the title, *Classification, Theoretical and Practical.*

RICHARDSON, Henry Hobson (1838-86). An American architect, born at Priestley's Point, Saint James's Parish, La. He graduated at Harvard in 1859, traveled in Europe, studied architecture at the Beaux-Arts, during a portion of his course was employed in the offices of a Government architect, and having returned to the United States in 1865, began the active practice of his profession in 1866 as a member of the firm of Gambrill & Richardson of New York City. In 1875 he removed to Brookline, Mass.

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He was a member of the American Institute of Architects, of the American Academy of Arts and Sciences, of the Archæological Institute of America, and an honorary and corresponding member of the Royal Institute of British Architects. Among the more important structures designed by him are Trinity Church, Boston, especially notable for its large central tower; the Brattle Street Church of Boston, remarkable also for a fine tower ornamented with a frieze of colossal sculptures; the City Hall, Albany, N. Y.; the New Law School for Harvard University; the Allegheny County buildings, at Pittsburg, Pa.; the Chamber of Commerce, Cincinnati, Ohio; and numerous public library buildings and railway stations. He established the successful use in American architecture of the Romanesque styles of Southern France, Auvergne in particular. It has been said that no modern architect more fully understood the value of sculpture in its application to buildings, and in the repose of his manner he is noteworthy among recent designers. His distinguishing qualities are breadth, unity, and simplicity; his principal defects an occasional carelessness of technique, and a tendency toward a grotesque manifestation of largeness and strength. His influence on his profession in the United States was very great, and his work may be considered to represent the nearest approach to a definite American style. In his Brookline workrooms he trained many students. Consult the biography by Van Rensselaer (Boston, 1888).

RICHARDSON, JAMES (1806-51). An English traveler and philanthropist, born in Lincolnshire. He early became interested in the suppression of the African slave trade, and, under the patronage of the English Anti-Slavery Society, edited a newspaper at Malta. He soon determined, however, to visit the interior of Africa in order to learn the causes of the slave trade, and, if possible, its remedy. He accordingly entered Morocco, but was unable to penetrate the interior. In 1845 he succeeded in reaching Ghadames and Ghat. On his return to England in 1847 he was aided by the Government in fitting out an expedition, and in March, 1850, accompanied by two Germans, Barth and Overweg, he left Tripoli, with the intention of exploring Lake Tchad. At Damerghou the three explorers separated, hoping to meet again on the shores of the lake. But while still two weeks' journey from the rendezvous, Richardson was prostrated by fever and died at Ungouratona on March 4, 1851. His papers, including his journal down to February 21st, were published under the title, *Mission to Central Africa, 1850-51, Under the Order of Her Majesty's Government* (1853). Richardson also wrote *Travels in Morocco* (1860) and *Travels in the Desert of Sahara, 1845-46* (1848).

RICHARDSON, JOHN (1787-1865). A British Arctic explorer and naturalist, born at Dumfries, Scotland. He was educated in the academy of his native town and studied medicine at the University of Edinburgh, where he obtained a surgeon's diploma in 1807. The same year he entered the Royal Navy as assistant surgeon, and was present at the battle of Copenhagen. Subsequently he served on the coast of Africa, on the Baltic and North Sea stations; afterwards in Canada, and in 1815 in Georgia, having charge of the hospital-ship for the sick and wounded of the brigade. In 1816 he received his M.D. degree from Edinburgh University and in 1819 was appointed surgeon and naturalist to the overland Polar expedition under Franklin. In 1825-27 he accompanied Franklin in his overland expedition to the mouth of the Mackenzie, and by orders of the Admiralty was detached to survey the coast between that river and the Coppermine. In 1846 Richardson was knighted. Two years later he was appointed to command the search for his former traveling companion, Sir John Franklin, of whom nothing had been heard for upward of two years. On March 25, 1848, Richardson, accompanied by Dr. Rae, left Liverpool and traveled via New York, Montreal, and the Canadian lakes to look for the missing expedition between the Mackenzie and Coppermine rivers. Reaching the headwaters of the Mackenzie, they descended the river to its mouth and then turned eastward by Capes Bathurst and Parry. With immense labor through dangerous drift-ice the party reached Cape Hearne, where they were obliged to abandon the boats, and after twelve days' fatiguing march, through half-frozen swamps and over hills covered with snow, they succeeded in gaining Fort Confidence, at the north point of Great Bear Lake. Here Richardson spent the winter in scientific observations, and, leaving Dr. Rae in command, returned to England in 1849, resuming his duties at Haslar. In 1855 Richardson resigned his office and devoted himself to literary work at Grasmere, where he died June 5, 1865.

Richardson contributed largely to the account of Franklin's first expedition (London, 1823); and to that of the second expedition (ib., 1828). His most important works are: *Fauna Boreali-Americana* (1829-37); *An Arctic Searching Expedition: A Journal of a Boat Voyage Through Rupert's Land and the Arctic Sea* (1851); *The Polar Regions* (1861).

RICHARDSON, SAMUEL (1689-1761). An English novelist, born in Derbyshire. His father was a joiner, who desired to educate his son for the Church; but this he could not afford, so at the age of sixteen, with such an education as a country school could furnish, the young man went to London, where he became apprentice to one John Wilde, a printer. In the discharge of his duties he was exact and careful, and on the expiration of his apprenticeship he became foreman. In 1719 he started as a printer on his own account, first in Fleet Street, and soon afterwards in Salisbury Court; and, on finding his success assured, he married Martha, daughter of Allington Wilde—not Richardson's former master. In 1754 he became master of the Stationers' Company and in 1760 he purchased the half interest of the patent of King's printer. He died July 4, 1761.

Till he had turned fifty, Richardson's relations with literature, except in the way of printing, were of the most slight and amateur kind; but in 1740, a year after two booksellers, Rivington and Osborne, had proposed to him that he should write a volume of familiar letters as patterns for youths and maidens in the country, Richardson surprised the world with his *Pamela*, which had instant and great success. Hughes may have given Richardson a hint for his *Pamela* in a story told in the *Spectator* (375). Its continuation, to which

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the author was stung by the issue of a pretended sequel, entitled *Pamela in High Life*, was, however, pronounced much inferior. *Pamela* suggested to Fielding his *Joseph Andrews*, originally conceived as a parody of Richardson's somewhat prudish moralities. The satire was not appreciated by Richardson, and he never forgave Fielding. In 1747-48 Richardson issued, in eight volumes, *The History of Clarissa Harlowe*—by common consent his masterpiece—a work which in its progress to completion aroused the most intense interest. His third and last great work, *The History of Sir Charles Grandison*, was published in 1753. As a whole, this is less interesting, and in his representation of the life of the fashionable classes, of which he had no clear personal knowledge, the writer succeeds but indifferently. Richardson had some knowledge of architecture. He has also been said, but groundlessly, to have studied at Christ's Hospital. Of the classic languages he had no more than a smattering. During his boyhood at least he seems to have been bashful and to have cared little for games, but he liked well to read when he had the time. He was a worthy apprentice and a good master, cautious, moral, and kind. He helped poor authors and was praised by Dr. Johnson for having "taught the passions to move at the command of virtue." Richardson dwelt for a while in a country house at North End, Hammersmith. Here he composed most of his novels.

Richardson's method of minute elaboration is somewhat wearisome. Moreover, the epistolary form which he chose, though it had certain advantages, led to novels of immense length. But there are singular sources of attraction in the depth and simplicity of Richardson's sentiment, his profound knowledge of the heart, and his mastery of elemental emotion, and in virtue of the overwhelming effects of pathos in which the interest of his *Clarissa* culminates, a place must be assigned him among the potent masters of genuine tragic passion. His specialty lies in subtle analysis of the feminine heart, and in this particular field he has hardly been surpassed. It seems to have been his instinct to cultivate a curious sort of passionless confidential intimacy with women; throughout life he was the centre of a circle of female friends and admirers, who came to him with their little delicate secrets, as to a kind of lay father confessor; and the fruits of his nice observation of them he has given us to the full in his novels. Richardson is thus the first outright psychologist in English prose fiction. He also created great character types, as Lovelace and Clarissa. His popularity was very great, both in England and on the Continent. He shaped the novel for a half century, and is still a force. Consult his works edited by Leslie Stephen (12 vols., London, 1883), and by Phelps with *Life* (New York, 1901); *Compendium*, edited by Barbauld (6 vols., London, 1804); Thomson, *S. Richardson: A Biographical and Critical Study* (ib., 1900); Dobson, *Richardson* (New York, 1902); Texte, *Jean-Jacques Rousseau et le cosmopolitisme littéraire au XVIIIème siècle* (Paris, 1895), translated into English as *Jean Jacques Rousseau and the Cosmopolitan Spirit in Literature* (London, 1899). See NOVEL.

RICHARDSON, WILLIAM ADAMS (1821-96). An American jurist, born at Tyngsborough, Mass. He graduated at Harvard in 1843, and was admitted to the bar in 1846. In 1855 he was appointed to revise the Massachusetts Statutes, and subsequently edited the annual supplements to the State General Statutes. In 1869 he became Assistant Secretary of the United States Treasury, in 1871 visited Europe as agent for the sale of the United States funded loan, and in 1873 became Secretary of the Treasury. In 1885 he was appointed Chief Justice of the Court of Claims, and at one time he was a professor in the Georgetown Law School. He published: *The Banking Laws of Massachusetts* (1855); *Practical Information Concerning the Debt of the United States* (1872); *National Banking Laws* (1872); and *History of the Court of Claims* (1882-85).

RICHARDT, rik'ärt, CHRISTIAN ERNST (1831-92). A Danish poet and dramatist, born in Copenhagen, noted for deep and refined feeling, and spiritual and patriotic fervor. He was a pastor. His comedy *Declarations* (1851) was followed by *Short Poems* (1861); *Pictures and Songs* (1874); *Fifty Poems* (1878); *King and Constable*, a musical drama (1878); *Spring and Autumn*, poems (1884); and *Miscellaneous Poems* (1891). *The Holy Land* (3d ed. 1889) was the fruit of a trip to the Orient. His *Samlede Digte* (or *Collected Poems*) were published in three volumes in 1894.

RICHELIEU, rē'shē-lōō' *or* -lyē'. A river of Canada (also called Chambly, Saint John, and Sorel). It is the outlet of Lake Champlain and flows into the Saint Lawrence River at Sorel on Lake Saint Peter, and has a straight course of 80 miles, ranging from 1000 feet to 1½ miles in width, through a picturesque and historic country (Map: Quebec, C 5). It is navigable to Chambly, whence a canal to Saint John obviates the rapids lying between.

RICHELIEU, rēsh'lyē', ARMAND EMMANUEL DU PLESSIS, Duke de (1766-1822). A French statesman, grandson of Marshal Richelieu (1696-1788), born in Paris and educated at the College of Plessis. He left France at the beginning of the Revolution, entered the Russian service, under Suvaroff, and became lieutenant-general. Alexander I. made him Governor of Odessa in 1803, but after a brilliant administration there he returned to France in 1815 to form a new Ministry under Louis XVIII. His influence with the allied powers enabled him to secure the withdrawal of their troops from France, and he was chief of Cabinet until 1818, when he resigned on account of his unsuccessful attempt to change the electoral law, according to his promise to the powers. He was recalled in 1820, retired within two years, and died shortly afterwards, the last of his name. Consult D'Asfeld, *Voyages et souvenirs du duc de Richelieu* (Paris, 1827).

RICHELIEU, ARMAND JEAN DUPLESSIS, Duke de, Cardinal (1585-1642). An eminent French statesman, born in Paris, September 5, 1585. He was educated for the army at the Collège de Navarre, but turned to the study of theology in order that he might succeed his elder brother as Bishop of Luçon. This he was able to do on the latter's retirement in 1606, and on April 16, 1607, the youthful prelate was consecrated at Rome in the presence of Pope Paul V. He devoted himself with earnestness to the work of his

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diocese and was successful as a preacher and administrator. As one of the representatives of the clergy at the States-General in 1614 he attracted the notice of the Queen mother, Maria de' Medici, by an address delivered in the presence of the young King, Louis XIII. He was made one of the Court almoners, and later, in 1616, entered the Royal Council as Secrétary for War and Foreign Affairs. The overthrow of Concini and the party of the Queen mother, and the rise of the royal favorite, De Luynes, to power, sent Richelieu temporarily back to his bishopric. De Luynes died in 1621, while carrying on a campaign against the Huguenots, leaving the kingdom in great disorder. The nobility were in revolt and strengthening themselves in the provinces, the Huguenots were in arms, and the influence of France in Europe was threatened by the growing ascendency of the House of Austria. Reconciled to her son, mainly through the diplomacy of Richelieu, who had remained her trusted counselor, Maria de' Medici obtained for the latter a cardinal's hat, and in 1624 he was recalled to the council. He soon became the chief Minister of State and retained that post until the end of his life—the real head of France in everything but name. In bringing about the reconciliation Richelieu had been greatly assisted by the Capuchin Father Joseph (q.v.), who remained afterwards his confidential assistant.

The new Minister's first important measure was the arrangement of a marriage between the King's sister, Henrietta Maria, and the Prince of Wales, afterwards Charles I. This assured friendly relations with England. It was necessary for Richelieu to suppress the Huguenots as a political faction, to reduce the disturbing nobles to obedience, and to restore the prestige which France had won under Henry IV. in the affairs of Europe. While carrying out the first of these objects he made alliances with and gave encouragement to the Dutch and German enemies of the Catholic House of Austria. He regarded the Protestants at home or abroad wholly with the eye of a statesman, and had no religious prejudices. As the power of the Cardinal increased Maria de' Medici became antagonistic. The King trusted him implicitly, but never liked him personally, and always was restive under the mastery of this greater mind. Richelieu's policy was directed toward a unified system of administration in France, and in foreign affairs his chief aim was to humble the power of the Austrian and Spanish Hapsburgs. Richelieu was instrumental in bringing Gustavus Adolphus (q.v.) into Germany, and during the later years of the Thirty Years' War France was an active ally of the Protestant cause in the field. (See THIRTY YEARS' WAR.) In 1628 the rebellious Huguenots were put down and La Rochelle was taken, after a siege of fifteen months, during which Richelieu commanded in person with great ability. After this triumph he showed the quality of his statesmanship by his liberality and clemency toward the conquered. In Italy France combated Austria and Spain in the War of the Mantuan Succession (1628-31), and Richelieu's diplomacy secured the recognition of the claims of Charles of Nevers. The ill will of the Court nobles whom Richelieu's influence had deprived of power over the weak King showed itself in frequent conspiracies against the Cardinal. Gaston of Orleans, brother of Louis XIII., played a leading part in these plots, which Richelieu, thanks to his system of espionage, punished relentlessly. The so-called conspiracy of Chalais ended in death for some of the leaders and imprisonment for others. A second great conspiracy, headed by the Queen mother, reached its crisis on November 11, 1630, when Richelieu himself had almost given up the struggle. The King refused him an audience, but Louis having withdrawn to Versailles, the Cardinal succeeded in seeing him there, overcame the influence of his enemies, demonstrated his necessity to France, and irrevocably fixed his ascendency. The day became known, from the discomfiture of the conspirators, as 'the day of dupes.' In 1631 the Duke of Montmorency (q.v.) rose against the Cardinal, only to perish on the scaffold. In the last years of his life Richelieu crushed the rising of the Count of Soissons and defeated the conspiracy of Cinq-Mars (q.v.). The later administration of Richelieu formed an important epoch in the history of the constitution of France and in her foreign relations. By a succession of vigorous and effective measures he succeeded in breaking down the political power of the great families of France and making the King an absolute ruler. The policy of war against Austria and Spain vindicated itself in its ultimate results, which, however, Richelieu did not live to see.

The character of Richelieu is one of those that moralists and historians delight to discuss. There is no question but that he was unscrupulous in the means that he used. There is equally no question that he used these means with a singleness of purpose for what he believed to be the good of France and his King. His policy was successful in developing the greatness and the power of France, but burdensome impositions were necessary to meet the enormous expenditures it entailed, and the unchecked absolutism that he fastened upon the country was in the long run a misfortune. What the France of his day justly feared, as a result of the melancholy experiences of two generations, was anarchy and a powerless executive. That danger Richelieu averted, but he went too far toward the other extreme. The variety and scope of his talents were remarkable. His writings fill several volumes, and some of them have much merit. Of the later ones his *Testament politique* and his *Mémoires* are most important. He also indulged in lighter literary diversions, and in the drama, but left nothing noteworthy. He was a liberal patron of literature, and to him France owes the founding of the French Academy. (See INSTITUTE OF FRANCE.) The *Palais Cardinal*, later known as the *Palais Royal*, was his Paris residence. He was as capable a military commander as he was a churchman, a civil administrator, and a diplomat. At the siege of La Rochelle he is said to have been his own engineer-in-chief. His *Lettres, instructions diplomatiques, etc.*, were edited by d'Avenal (8 vols., Paris, 1853-77).

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RICHELIEU, Louis François Armand du Plessis, Duke de (1696-1788). A marshal of France, born in Paris, a grandnephew of the great Cardinal. He took an active part in Court intrigues and was comrade and assistant to Louis XV. in his love affairs. As a soldier he distinguished himself at Fontenoy. He was made marshal in 1748, Governor of Guyenne in 1755, and won great renown in the taking of Port Mahon, Minorca, in 1756. He succeeded Marshal D'Estrées as commander in Hanover, where he enriched himself by pillage and permitted his troops to do the same. His later days, as his earlier, were occupied with the dissipations of the royal circle at Paris. He was a witty, if not a wise man, and the friend and protector of Voltaire, but better known for his patronage of Du Barry and for his utter lack of seriousness. His memoirs were edited by Soulavie in 1793; and he is prominent in most other memoirs of the period. Consult Faur, *Vie privée du maréchal de Richelieu* (Paris, 1792).

RICHEPIN, rêsh'păn', Jean (1849—). A French poet, novelist, and dramatist. He was born at Médéah, in Algeria, February 4, 1849. For a while he was a sailor, and he fought as a rifleman in the Franco-German wars. He at first studied medicine and then entered the Ecole Normale in Paris. After an apprenticeship in journalism, fiction, and drama he published (1876) *La chanson des gueux*, for the frank immorality of which he was fined 500 francs and imprisoned one month. In prison he wrote *Les mortes bizarres* (1877). Among later works are the poems *Les caresses* (1877), *Les blasphèmes* (1884), *La mer* (1886), *Mes paradis* (1893); the stories *La Glu* (1881); *Braves gens* (1888); the plays *Nana Sahib* (1882), *Monsieur Scapin* (1886), *Le flibustier* (1888), *Par le glaive* (1892), *Les truands* (1889). Richepin is a romantic, and a poet and notably a dramatist of talent. *Par le glaive* is a noble and beautiful drama written in fine, sonorous Alexandrines.

RICHER, rê'shâ', Edmond (1560-1631). A French theologian, born at Chaource, Aube. He was made a doctor of theology by the Sorbonne, and taught belles-lettres, rhetoric, and philosophy in the college of Cardinal Le Moine, of which he became director in 1594. The following year he came forward prominently as the chief opponent of the Jesuits, who in their turn attacked his work *De Ecclesiastica et Politica Potestate* (1611), and he was forced to resign as syndic of the Sorbonne in 1612. He was summoned to appear before the Inquisition at Rome, and was imprisoned on his return to Paris, but was released. He made his defense in *Historia Conciliorum Generalium* (1683), and *Histoire du syndicat de Richer* (1753), both published posthumously. He also wrote *De Analogia, Causis Eloquentiæ et Linguæ Patriæ Locupletandæ Methodo* (1601), and other works.

RICHER, Paul (1849—). A French neurologist, born at Chartres. He was educated in Paris, from 1882 to 1895 was director of the laboratory connected with the Salpêtrière clinic of nervous diseases, and in 1898 was elected to the Academy of Medicine. He wrote *Etudes cliniques sur la grande hysterie* (1885, crowned by the Institute), but he is perhaps better known for his connection with art and anatomy. A pupil of Charcot, and a draughtsman of some ability, he published in collaboration with his master, *Les demoniaques dans l'art* (1886) and *Les difformes et les malades dans l'art* (1889); and, alone, an *Anatomie artistique* (1890), which was crowned by the Academy of Fine Arts and by the Academy of Sciences, and *Physiologie artistique de l'homme en mouvement* (1895).

RICHET, rê'shâ', Alfred (1816-91). A French surgeon, born at Dijon. He rose rapidly in his profession, became a member of the Academy of Medicine in 1865, did good service in the ambulance corps in the siege of Paris, and in 1873 was commander of the Legion of Honor. Long professor of clinical surgery, Richet wrote *Traité pratique d'anatomie médico-chirurgicale* (1857), and among special treatises, *Leçons cliniques sur les fractures de la jambe* (1875).

RICHET, Charles (1850—). A French physiologist, son of the preceding. He was born and educated in Paris, was a prominent member of the French Biological Society (1881 et seq.), and received in 1879 a prize from the Institute for his monograph, *Propriétés chimiques et physiologiques du suc gastrique*. In 1887 he succeeded Béclard as professor of physiology in the medical faculty of the University of Paris, and in 1899 was chosen a member of the Academy of Medicine. His works include: a translation of Harvey on the circulation of the blood (1879); *L'homme et l'intelligence* (1884; 2d ed. 1890); *Essai de psychologie générale* (1888; 2d ed. 1892; Russian translation in 1889 and Polish, 1890); and a *Dictionnaire de physiologie* (1899).

RICH'FIELD SPRINGS. A village in Otsego County, N. Y., 35 miles southeast of Utica, near Canadarago Lake, and on the Delaware, Lackawanna and Western Railroad (Map: New York, E 3). The mineral springs of the vicinity are noted for their medicinal properties, and are much frequented. Beautiful scenery and attractive drives are to be noted here. There are manufactures of Scotch caps and knit goods. Though settled as early as 1758, Richfield Springs did not become a summer resort until 1820. Population, in 1890, 1623; in 1900, 1537.

RICH HILL. A city in Bates County, Mo., 85 miles south by east of Kansas City, on the Missouri Pacific and the Kansas City, Fort Scott and Memphis railroads (Map: Missouri, B 3). It is situated in the mineral belt of southwest Missouri, in the section noted for its extensive coal fields. Rich Hill carries on considerable trade in farm produce and live stock, and has zinc and lead smelting works, machine shops, manufactures of vitrified brick and tile, and flour mills. Population, in 1890, 4008; in 1900, 4053.

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RICHIBUCTO, rish'i-bŭk'tō. A town and port of entry of Kent County, New Brunswick, Can., on Richibucto Harbor and on the Inter-Canadian Railway, 25 miles east of Kent Junction (Map: New Brunswick, E 3). It is the eastern terminus of the Kent Northern Railway. It has shipbuilding, lumber, and fishing industries. Population, in 1901, 4000.

RICH'MOND. A city of Bourke County, Victoria, Australia, constituting a suburb of Melbourne (q.v.). Population, in 1889, 37,550; in 1901, 37,722.

RICHMOND. A town in Surrey, England, 8 miles west-southwest of London, on the right bank of the Thames (Map: England, F 5). It is a favorite summer resort for Londoners. The rich and beautiful scenery of the vicinity is seen with advantage from the Terrace, which stretches along the brow of the hill, on the slopes and summit of which the town is built. The banks of the Thames are studded with villas, and around the town are numerous nurseries and kitchen gardens. As Schene or Sheen, Richmond was a royal residence from the time of Edward I. until the reign of James II. To the southeast of the town is Richmond Park, presented to the citizens of London by Charles I. in 1634. Richmond was not incorporated until 1890, but had been favored with a progressive vestry which established a water supply, public baths, and a free library. The municipality has built a fine town hall, artisans' dwellings, technical school, and isolation hospital, and maintains cemeteries, sewage works, and pleasure grounds. Population, in 1891, 26,875; in 1901, 31,677. Consult: Chancellor, *Historical Richmond* (London, 1895); Garnett, *Richmond* (ib., 1896).

RICHMOND. A city and the county-seat of Wayne County, Ind., 69 miles east of Indianapolis, on the Whitewater River, here crossed by iron bridges, and on the Pittsburg, Cincinnati, Chicago and Saint Louis, the Grand Rapids and Indiana, and the Cincinnati, Richmond and Muncie railroads (Map: Indiana, E 3). It is the seat of Earlham College (Orthodox Friends), opened in 1847, and has the Morrison-Reeves Library (public) with 27,000 volumes, and the Richmond Law Library. The Eastern Indiana Hospital for the Insane is here, also Saint Stephen's Hospital, and homes for orphans and for women. There are fine public school buildings, including a large high school, and among other public edifices of note are the city hall and the county court-house. Glen Miller Park comprises about 135 acres. The yearly meeting of the Orthodox Friends of Indiana is held in Richmond. The city is the commercial centre of a fertile agricultural section, and is important also for its manufactures, which, in the census year of 1900, represented capital to the amount of $5,175,000, and had an output valued at $5,282,000. The chief products include threshing machines, traction engines, grain drills, lawn mowers, carriages and wagons, steam engines and boilers, church furniture, desks, pianos, brick, paper, paper bags, flour, sawed lumber, etc. Laid out in 1816, Richmond was incorporated two years later as a town, and in 1840 received a city charter. It is situated on the old National Road. Population, in 1890, 16,608; in 1900, 18,226.

RICHMOND. A city and the county-seat of Madison County, Ky., 50 miles southeast of Frankfort, on the Louisville and Nashville and other railroads (Map: Kentucky, G 3). It is the seat of the Madison Female Institute. Farming and the breeding of horses constitute the principal industries. Population, in 1890, 5073; in 1900, 4653.

RICHMOND. A city and the county-seat of Ray County, Mo., 40 miles east by north of Kansas City, on the Atchison, Topeka and Santa Fe Railroad (Map: Missouri, B 2). It is situated in a region engaged in agriculture, cattle-raising, and coal-mining, and manufactures flour and lumber products. The Woodson Institute is here. Population, in 1890, 2895; in 1900, 3478.

RICHMOND. The largest city of Virginia and a port of entry, the State capital and county-seat of Henrico County, 116 miles south by west of Washington, D. C. (Map: Virginia, G 4). It is situated on the James River, 127 miles from the Atlantic Ocean, at the head of tidewater. The rapids here have a fall of 100 feet in 6 miles and furnish an immense water power. A canal extends around the rapids, providing means for navigation by smaller vessels for a considerable distance above the city. Several bridges span the James, connecting with Manchester and other suburbs. There are steamship lines to Atlantic coast ports, and the railroad facilities comprise the Southern Railway, the Atlantic Coast line, the Seaboard Air Line, the Chesapeake and Ohio, the Norfolk and Western, and other roads.

The site of Richmond is of great natural beauty. It is regularly laid out on a succession of low hills that rise from the northern bank of the James, the highest point reaching an altitude of 250 feet above the sea. The area is about 5½ square miles. More than three-fourths of the total street mileage (120 miles) is paved, macadam and Belgian blocks being used in the more important thoroughfares. The parks and cemeteries of Richmond and its monuments are of especial interest. The public park system, with an aggregate area of 376 acres, includes Reservoir Park of 300 acres on the western bounds of the city; Monroe, Gamble's Hill, Jefferson, Marshall, and Chimborazo parks, besides the Capitol Square. Capitol Square, on Shockoe Hill in the heart of Richmond, is 12 acres in extent. Here is situated the State Capitol (1785-96), modeled at the suggestion of Thomas Jefferson, after the Maison Carrée at Nîmes. In the Capitol are busts and portraits of many eminent men, including the celebrated marble statue of Washington by the French sculptor Houdon in the rotunda. There are also in the square the new State Library, used mainly as an office building, the Governor's mansion, and the old Bell House. On the grounds, near the Capitol, is a splendid monument to Washington. Statues of Henry Clay and 'Stonewall' Jackson by Hart and Foley, respectively, also adorn Capitol Square.

In Monroe Park are a statue of General Wickham and the site of the Jefferson Davis Monument. Gamble's Hill Park is noteworthy for the splendid view it affords. It overlooks the famous Tredegar Iron Works and the river with the historic Belle Isle and other islands. On Libby Hill (Marshall Park) stands the Con-

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federate Soldiers' and Sailors' Monument. This elevation also commands a good view of the James and its islands and bridges. In Chimborazo Park (29 acres) was a well-known Confederate hospital. A fine road leads from this park to the National Cemetery, two miles to the southeast of the city. Next in importance after the Washington Monument is the equestrian statue of General Robert E. Lee in Lee Circle. The Jefferson Monument and the Howitzer Monument also are worthy of note. Hollywood Cemetery is the most interesting in Richmond. It is the burial place of many famous persons, as well as of 18,000 Confederate soldiers in honor of whom is a rough pyramidal monument of granite. Other cemeteries are Riverview, Mount Calvary, and Oakwood, the last also having several thousand Confederate Soldiers' graves. The National Cemetery contains 6553 graves, 5700 of unknown dead.

The City Hall, facing Capitol Square on the north, ranks with the Capitol among the public buildings of Richmond. It is a handsome structure of granite with a tower 180 feet high. It cost $1,500,000. Other edifices of importance are the Chamber of Commerce, the post-office, the State penitentiary, the Soldiers' Home, and the new depot of the Chesapeake and Ohio and the Seaboard Air Line. Among historic buildings are the Old Stone House, the oldest in Richmond; Saint John's Church (1740); the 'White House of the Confederacy,' which now serves as a repository for Confederate relics; General Lee's residence, the home of the State Historical Society; the Masonic Temple, dating from 1785; and Chief Justice Marshall's house. The Valentine Museum has more than 100,000 archæological specimens, many objects of historic interest, and an art collection. Richmond is the seat of Richmond College (Baptist), opened in 1832; Union Theological Seminary (Presbyterian), opened in 1812; the Medical College of Virginia; the University College of Medicine; and the Women's College. The institutions for colored students include the Hartshorn Memorial College, and Virginia Union University (Baptist), opened in 1899. There are also a number of private schools, and the Mechanics' Institute, which has been recently installed in a new building. The State library, with nearly 100,000 volumes, is the largest in the city. Other important collections are the Rosemary Public Library, the State Law Library, and that belonging to the Virginia Historical Society. Among the charitable institutions are the Old Dominion Hospital, Virginia Hospital, Saint Luke's Hospital, the Eye, Nose, Ear, and Throat Infirmary, Retreat for the Sick, Sheltering Arms, and the City Almshouse and Hospital.

Richmond is an important industrial and commercial centre. Its commercial interests are confined almost entirely to a wholesale and jobbing and retail trade, its foreign commerce having amounted in 1901 to only $111,173. The jobbing trade in the same year amounted to $41,375,000, and the retail trade at $14,000,000. Bank clearings for 1901 aggregated nearly $2,000,000. Plans are under way for deepening the channel of the James from Richmond to the sea, so as to provide a minimum depth of 22 feet at mean low tide. This improvement will add considerably to the commercial advantages of the city. As an industrial centre, Richmond ranks first in the State, its tobacco and iron interests being of primary importance. It is one of the leading tobacco markets in the United States, the tobacco industry being represented by stemming and rehandling establishments, and by manufactories of chewing and smoking tobacco, snuff, cigars, and cigarettes. The iron interests include foundries and machine shops, locomotive works, car-axle and railroad spike works, and nail, horseshoe, and agricultural implement works. Flour and fertilizers also are manufactured extensively. Other products are boxes, carriages and wagons, lumber (cedar, woodenware, hubs and spokes, etc.), tin roofing, tin tags, baking powder, paper, twine, meat juice, trunks and bags, hats, etc. Some shipbuilding is carried on. The various industries in the census year 1900 possessed $20,849,000 capital, and an output valued at $28,901,000.

The municipal government, under a charter of 1870, revised in 1891 and 1892, is vested in a mayor, elected every two years; a bicameral council; and administrative officers, most of whom are elected by the council in joint session. A number of important officials are chosen, however, by popular vote. Richmond spends annually for maintenance and operation about $1,262,000, the chief items being: interest on debt, $376,000; the gas works, $137,000; schools, $125,000; the police department, $105,000; the fire department, $93,000; streets, $92,000; charitable institutions, $43,000; municipal lighting, $35,000; the water-works, $34,000. The actual income for the fiscal year 1902 was more than $1,600,000. The water-works and the gas-works are the property of the municipality. The gas plant cost $994,000 and now has 80 miles of mains. The water-works system cost $2,323,500 and includes 103 miles of mains. There are two reservoirs with a storage capacity of 52,000,000 gallons, and a daily pumping capacity of 24,000,000 gallons. The net debt of the city in 1902 was $6,610,582; the assessed valuation of real and personal property was $71,117,607.

The population of Richmond in 1800 was 5737; in 1850, 27,570; in 1860, 37,910; in 1870, 51,038; in 1880, 63,600; in 1890, 81,388; in 1900, 85,050. The total population in 1900 included 2865 persons of foreign birth and 32,230 of negro descent.

In 1609 Capt. John Smith bought from the Indians a tract of land near the site of Richmond and founded a settlement which he called 'None Such.' In 1645 Fort Charles was built in the vicinity, and near here in 1676 Nathaniel Bacon (q.v.) defeated the Indians in the 'battle of Bloody Run.' By grants in 1675 and 1687, Col. William Byrd obtained possession of the land in this district, and in 1733 his son, Col. William Evelyn Byrd, laid out a town which he named Richmond. In 1742 Richmond was incorporated. In Saint John's Episcopal Church in 1775, Patrick Henry made his famous speech, closing with the words, "Give me liberty or give me death." Richmond became the capital of the State in 1779, and in 1782 it was chartered as a city. On January 5, 1781, a small English force under General Benedict Arnold entered the place and destroyed all the warehouses and public buildings. In 1788 the convention which ratified the Federal Constitution for Virginia met in Saint John's Church. The 'Virginia Resolutions' of 1798-99 were passed at Richmond, and here, in 1861, Virginia formally adopted the Act of Secession. From

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May, 1861, to April, 1865, Richmond was the capital of the Confederacy, and as such was the objective point of the Federal forces, which fought fifteen pitched battles and at least twenty skirmishes in the effort to capture it. On April 2, 1865, it was evacuated by the Confederates, who, by order of General Ewell, set fire to the warehouses and destroyed the greater part of the business portion of the city. The Federal forces entered the place on the day after its evacuation. Consult: a sketch by Henry, in Powell, *Historic Towns of the Southern States* (New York, 1900); "Richmond Since the War," in *Scribner's Monthly* (ib., 1877); and Wood, *The Industries of Richmond* (Richmond, 1886).

RICHMOND, Charles Lennox, third Duke of (1735-1806). An English diplomat and statesman. He was born in London, and succeeded to the peerage on the death of his father, the second Duke, in 1750. He was educated at Westminster School, later proceeding to Leyden University, where he graduated in 1753. He entered the army, saw active service in France, and was mentioned for his bravery at the battle of Minden in 1759, where he served as colonel of his regiment. He received a Court appointment, but, disagreeing with George III., resigned and joined the opposition Ministry. In 1765 he was sent to Paris as Ambassador Extraordinary, became a Privy Councilor, and the following year was appointed Secretary of State for the South. He was a strong supporter of the American colonies in their demands for redress of grievances; in 1770 he introduced conciliatory resolutions which were carried by a majority, and in 1775 during a debate on American affairs defended the attitude of the colonists, declaring that their resistance was "neither treason nor rebellion, but perfectly justifiable in every possible political and moral sense." In 1778 he moved the resolution for the withdrawal of the troops from America. In 1782 he received the appointment of master-general of ordnance with a Cabinet seat, and was created a knight of the Garter. He was reinstated in royal favor, and his later career was marked by subserviency to Court interests.

RICHMOND, Dean (1804-66). An American capitalist, born in Bernard, Vt. He opened a produce business in Buffalo in 1842, became wealthy, and held office in several corporations. He took an active interest in railways and was influential in securing the consolidation of the several corporations that later constituted the New York Central Railroad. Of this railroad he became vice-president in 1853 and from 1864 until his death was president. In politics he was an active Democrat, and though he refused to accept any public office, he was for several years the chairman of the Democratic State Committee and the leader of his party in New York State.

RICHMOND, George (1809-96). An English portrait painter, born in Brompton. He was a pupil of the Royal Academy, and became a member of the Royal Academy in 1867. He painted portraits of many of his celebrated contemporaries, such as Dr. Keble, the Earl of Elgin, Sir Moses Montefiore, and Lord Salisbury. His early work was influenced by William Blake, whom he greatly admired. Many of his portraits are in water color and crayon, but he also painted in oil, and did some work in sculpture.

RICHMOND, Legh (1772-1827). An English writer and evangelical divine, born in Liverpool. He graduated at Trinity College, Cambridge (1794); was ordained to the curacy of Brading and Yaverland in the Isle of Wight (1799); became chaplain to the Lock Hospital, London (1805), and the same year rector of Turvey in Bedfordshire. He was an earnest evangelical preacher. Between 1809 and 1814 he contributed to the *Christian Guardian* three famous village tales—"The Dairyman's Daughter," "The Young Cottager," and "The Negro Servant." All three were reprinted in 1814 as *The Annals of the Poor.* Before 1849 4,000,000 copies of the *Dairyman's Daughter* had been issued in nineteen languages. Richmond published also *Fathers of the English Church,* and after his death appeared *Domestic Portraiture.* Consult the *Life* by Grimshaw (London, 1828; ed. by G. T. Bedell, Philadelphia, 1846).

RICHMOND, Sir William Blake (1843—). An English historical and portrait painter, born in London. He was the pupil of Sir Frederick Leighton, and his works belong to the order of classic genre made popular by Leighton and Alma-Tadema. They include "Amor Vincit Omnia," and "An Audience in Athens During the Representation of the Agamemnon" (1885, in the Birmingham Gallery). He also painted several portraits of celebrities. He was Slade professor at Oxford from 1878 until 1883, became an associate of the Royal Academy in 1888, and was knighted in 1897. He designed and superintended the mosaic decoration of the interior of Saint Paul's Cathedral, London.

RICHTER, rĭk'tĕr, Aemilius Ludwig (1808-64). A German jurist, born at Stolpen, Saxony, and educated at Leipzig. His *Corpus Juris Canonici* (1833-39) led to his being appointed professor of law in Leipzig, and he held subsequently similar positions at the universities of Marburg and Berlin. He also served as councilor-in-chief of the consistory and Privy Councilor of the Government. Richter is considered the founder of a new school of Church law—the so-called 'Berliner Kanonisten-Schule.' His publications include: *Beiträge zur Kenntnis der Quellen des canonischen Rechts* (1834); *Canones et Decreta Concilio Tridentini* (1853); and *Lehrbuch des katholischen und evangelischen Kirchenrechts* (1842-86), which is considered a most important contribution to Church law literature.

RICHTER, Eugen (1838—). A German politician, born in Düsseldorf, and educated at Bonn, Heidelberg, and Berlin. In 1864 his election as burgomaster of Neuwied was not confirmed because of his liberal views. He resigned from his governmental post and settled in Berlin as a journalist. He was elected to the North German Diet in 1867, to the Prussian House of Deputies in 1869, and in 1871 to the Reichstag, where he was a leader of the Progressists and later of the Radicals. Intensely individualistic, he attracted attention by his opposition to State control of railroads, increase of war budgets, an Imperial colonial policy, and protectionism. Richter's opposition to Bismarck was particularly bitter. His political attitude sometimes placed him in opposition to his own party, and the *Freisinnige Zeitung,* founded by him in 1885, was on many subjects, especially on social reform, in direct contradiction to the other

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papers of the party. He wrote: *Politisches ABC Buch* (1879-98); *Die Irrlehren der Sozialdemokratie* (1890); *Sozialdemokratische Zukunftsbilder* (1891; in English, 1892); *Jugenderinnerungen* (1892); and *Im alten Reichstag, Erinnerungen* (1894).

RICHTER, GUSTAV (1823-84). A distinguished German figure and portrait painter, born in Berlin. He began his studies at the academy there under Eduard Holbein, then was a pupil of Cogniet in Paris, and studied in Rome until 1849. The brilliant technical qualities of his "Raising of Jairus's Daughter" (1856, National Gallery, Berlin), painted by commission of King Frederick William IV., aroused great enthusiasm on its exhibition, but this and a large oil painting of the "Building of the Pyramids" (1859-72, Maximilianeum, Munich), ordered by the King of Bavaria, suffer from theatrical pathos, and, recognizing the limitations of his talent, Richter confined himself thereafter to the depiction of single figures, and to portraiture, in which he was eminently successful. The first of a series of portraits of aristocratic beauties was that of "Princess Carolath," which created a sensation in 1872. Of several family groups, reflecting the artist's own domestic happiness, two called "Evviva!", the painter with his first-born, and "Maternal Happiness," the painter's wife (youngest daughter of Meyerbeer) with their younger boy, were among the gems of the exhibition in 1874. From the last decade of his life date his maturest works, in which he combined a thorough characterization with the purely pictorial qualities. The splendid portrait of a "Banker's Wife" (1876) was followed by that of "Countess Károlyi" (1878), which distanced all his former efforts, but was surpassed in its turn by the well-known ideal portrait of "Queen Louise" (1879, Cologne Museum). Mention should be made also of the portraits of "Emperor William I." (1876 and 1877), "Empress Augusta" (1878), and "General Count von Blumenthal" (1883, unfinished, National Gallery, Berlin). The Metropolitan Museum, New York, contains a figure of "Victory."

RICHTER, HANS (1843—). An Austrian musical conductor, born in Raab, Hungary, where his father was kapellmeister. In 1853 he became a chorister in the Court Chapel at Vienna, and began his musical studies at the Conservatory. From the year 1866 dated his intimacy with Wagner, who in 1868 secured him the appointment of chorus-master at the Munich Opera. Two years later he conducted *Lohengrin* at Brussels, and from 1871 to 1875 served as kapellmeister at the Budapest National Theatre. He conducted the concerts of the Vienna Gesellschaft der Musikfreunde for several seasons, gave many important concerts, and in 1876, alternately with Wagner, conducted the *Nibelungen* performances at Bayreuth. In 1877 he commenced the annual Richter Concerts, in London, which were among the most important musical events of the country. He was chosen in 1877 as the chief conductor of the Bayreuth Festival. He conducted also the Lower Rhenish festivals, and most of the important English festivals.

RICHTER, JOHANN PAUL FRIEDRICH, usually called by the name he chose himself, JEAN PAUL (1763-1825). The most widely known of German humorists. He was born at Wunsiedel, a village in Upper Franconia. In 1779 he began to attend the gymnasium at Hof. Soon his father died, leaving his wife and Jean Paul to be cared for by Jean Paul's grandparents at Hof. On their death the mother and son were penniless, and had to make what shift they could while Jean Paul studied at the gymnasium. In 1781 he went to Leipzig to study theology, but he soon fell under the influence of Rousseau and of English humorists and satirists. He had earlier begun to make a collection of jests and anecdotes. Finding no opening as a teacher, he turned to literature. The *Encomium Moriæ* of Erasmus set him to writing his *Lob der Dummheit*, but his book found no publisher till after his death. In his anonymously published *Grönländische Prozesse* (1783) he satirized authors, women, theologians, ancestral pride, etc., but his satire fell rather flat. Poverty soon drove him to flee from Leipzig to avoid his creditors (1784). The next three years (1784-87) he spent in reading, hack writing, and desultory rambling. Then some parents were induced to trust him with the education of their children, and for nine years he practiced his original pedagogic theories, writing the while some clever satires, *Auswahl aus des Teufels Papieren* (1789); *Fälbels Reise* (1796); the more famous idylls *Schulmeister Wuz* (1793), and *Quintus Fixlein* (1796); translated by Carlyle, 1827), and the novels, *Die unsichtbare Loge* (1793), and *Hesperus* (1794, trans. 1865). *Hesperus* attracted the attention of Charlotte von Kalb, who, in 1796, invited Richter to Weimar, where Goethe received him with cool politeness, as did Schiller at neighboring Jena, his influence being contrary to their own aspirations for a classical German literature. Herder's welcome was warm, and Charlotte von Kalb tendered her heart with her hand, Weimar society being in those days still 'imperfectly monogamous.'

In the first flush of his good fortune Richter wrote *Blumen-, Frucht- und Dornenstücke, oder Ehestand, Tod und Hochzeit des Armenadvokaten Siebenkäs* (1796-97, trans. 1844, 1871, 1877); and *Das Kampanerthal* (1797), wearisome reflections on immortality. He fascinated the Weimar ladies with his conversation, and more still by his sympathetic listening smile. He returned to Hof in 1797, only to take wing for a longer flight to Weimar, Leipzig, and Berlin, where he married Caroline Mayer (1801). After three years of wedded wandering he settled in Bayreuth. Here he passed the rest of his life, twenty-one years, in harmless eccentricity. The rather futile novel *Titan* (1801-03) had already appeared. The first fruit of Bayreuth was the uneven and unfinished *Flegeljahre* (1804-05), showing the influence of Goethe's *Wilhelm Meister*, with passages of charming description, humorous satire, and delicate fancy that suggest Laurence Sterne. This is Richter's last work of pure imagination that one is not glad to forgive and forget. But in his last years he made valuable contributions to pedagogy in *Levana* (1807), to art in his *Vorschule der Aesthetik* (1804), and to politics in his *Dämmerungen für Deutschland* (1809), and *Fastenpredigten* (1810-12), continued with redoubled scorn in 1817. *Levana*, though disconnected and unfinished, was full of fruitful suggestion, especially in its portions dealing with the education of women. Goethe praised it warmly for "the

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boldest virtues, without the least excess." The *Aesthetik* is valuable chiefly for its keen analysis of humor and happy praise of wit. It closes with a glowing eulogy of Herder and is a fragmentary development of his theory. The political papers, the most virile and practical of Richter's works, were bold denunciations of Napoleon and the German sycophants, whereas those of 1817 held up to even more merited shame the German princes who mocked the promises by which they had regained power. Disease troubled the peace of Richter's last years. He traveled much, and might to advantage have written less. He died in Bayreuth November 14, 1825. An *Autobiography* appeared in 1826. Though for a time widely popular, and still highly prized by a few, Richter was without lasting influence on the currents of German literature.

Richter's *Works* are edited in 34 vols. (Berlin, 1860-62), and in 60 parts (ib., 1879 et seq.). There is a continuation to the *Autobiography* by Otto and Förster (Breslau, 1827-33); a *Biographischer Kommentar* by Spazier (Leipzig, 1833). Consult also: Förster, *Denkwürdigkeiten* (Munich, 1863), and the *Correspondence* of Richter with Otto (Berlin, 1829-33), Charlotte von Kalb (ib., 1882), Jacobi (ib., 1828), and Voss (Heidelberg, 1833); Vischer, *Kritische Gänge*, vol. i. (Stuttgart, 1873); Nerrlich, *Jean Paul, sein Leben and seine Werke* (Berlin, 1890); Carlyle's *Miscellaneous Essays*, vols. i. and iii. (Boston, 1839); De Quincey's *Life of Richter* (London, 1845); J. Müller, *Jean Paul und seine Bedeutung für die Gegenwart* (Munich, 1894); id., *Die Seelenlehre Jean Pauls* (ib., 1894); id., *Jean-Paul Studien* (ib., 1899); and the selections from his writings by Lady Chatterton (London, 1859).

RICHTER, LUDWIG (1803-84). A German landscape painter, etcher, and draughtsman, and one of the greatest illustrators of all times. He was born in Dresden, the son of the engraver Karl August Richter (1778-1848), who first instructed him. After his return from a sojourn in Rome (1823-26), he was appointed instructor in the school of drawing at the porcelain factory in Meissen and in 1836 at the Dresden Academy, where he continued as professor from 1841 to 1877. The interest of his uneventful life centres within the circle of his art. As a painter Richter aimed at a thorough blending of the figure element with the landscape and may be judged by the following examples: "Valley of Amalfi" (1824), "Bay of Salerno" (1826), "Harvest Procession in the Campagna" (1833), a composition in the vein of Claude Lorrain, "Evening Landscape with Worshipers" (1842), all in the Leipzig Museum; "Ferry at the Schreckenstein" (1836), "Bridal Procession in Springtime" (1847), both in Dresden Gallery; and "View in the Riesengebirge" (1839), in the National Gallery, Berlin. Among his 240 etchings are about 140 views in Saxony, others of Salzburg, Rome, and the Campagna. His individuality as a great artist is revealed, however, neither through his brush nor his burin, but in his 3000 or more drawings for the woodcut, of which he is to be counted, with Adolf Menzel, one of the most influential revivers. His first contribution in that line, of 25 drawings, to *Das malerische und romantische Deutschland* was followed by the illustrations to Marbach's *Deutsche Volksbücher* (1838), to Duller's *Geschichte des deutschen Volks* (1840), to *The Vicar of Wakefield* (1841), to Musäus's *Volksmärchen* (1842), and to numerous other fairy tales, to the *Goethe Album* (1855), to Schiller's *Glocke* (1857), and by those cyclical publications which reveal the most brilliant side of the artist's inexhaustible fancy, such as "Beschauliches und Erbauliches" (1851); "Kinderleben" (1852); "Fürs Haus" (1858-61); "Der gute Hirt" (1860); "Unser täglich Brot" (1866); and "Bilder und Vignetten" (1874). An eye disease put a stop to the practice of his art in 1874, and after retiring from his professorship in 1877 he was pensioned. He died at Loschwitz, near Dresden. Consult his autobiography, *Lebenserinnerungen eines deutschen Malers*, edited by his son Heinrich (10th ed., Frankfort, 1900); the monographs by Hoff (Dresden, 1877), Erler (Leipzig, 1897), and Mohn (Bielefeld, 1898); also Pecht, *Deutsche Künstler*, i. (Nördlingen, 1877); Springer, in *Zeitschrift für bildende Kunst* (Leipzig, 1883); Atkinson, in *Art Journal* (London, 1885); and Lützow, *Die vervielfältigende Kunst der Gegenwart* (Vienna, 1886).

RICHTHOFEN, rĭkt'hō'fen, FERDINAND, Baron (1833—). An eminent German traveler, geologist, and geographer, born at Karlsruhe, in Silesia. He studied in Breslau and Berlin, traveled in Eastern Asia and Oceanica (1860-68), and after a short stay in California explored Japan and China. In 1875 he was named professor of geology at Bonn, and after three years in a chair of geography at Leipzig, in 1886 became a professor in the University of Berlin. In 1902 he became director of the newly founded Institut für Meereskunde. His chief works include: *Geognostische Beschreibung von Predazzo* (1860); *The Natural System of Volcanic Rocks* (1867); *Letters on China* (1870-72); *China* (1877-83); *Atlas von China* (1885); *Methoden der heutigen Geographie* (1886); and *Schantung und seine Eingangspforte Kiautschou* (1898). In English he published: *The Comstock Lode* (1865); *Principles of the Natural System of Volcanic Rocks* (1867); and *Letters to the Shanghai Chamber of Commerce* (1869-72).

RICIMER, rĭs'ĭ-mĕr (?-472). A Roman general of the Western Empire. His father was a Suevian chief, and his mother a daughter of Wallia, King of the Visigoths. He was brought up at the Roman Court, rose rapidly in the army, and defeated the Vandals in a naval battle near Corsica, and in a land fight near Agrigentum (456). Immediately after this he attacked Avitus, who had been proclaimed Emperor of the West, defeated him at Placentia, and put Majorianus in his place. In 461 he deposed Majorianus and crowned Libius Severus, and, after managing the Empire himself during an interregnum of a year and a half, brought Anthemius to the throne (467). In 472 he quarreled with Anthemius, and, deposing him, made Olybrius King, but died himself a little more than a month after, having been the real power in Italy for sixteen years.

RICINUS. See CASTOR OIL.

RICK'AREES, or **ARICARAS,** ȧ-rē'kȧ-rȧz. A tribe of Pawnee Indians. See ARIKARA.

RICKETS, or **RACHITIS** (from *wrick*, MDutch *wricken*, Dutch, LGer. *wrikken*, to move

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to and fro). A disease of nutrition, the chief feature of which is an alteration in the growth of the bones by which they become enlarged at their extremities and so soft that they are bent and distorted by muscular action and the weight of the body. It is essentially a disease of children, occurring as a rule between the ages of one and two years. The causes are improper and insufficient food, and bad hygienic surroundings. The faults of diet from which infants are likely to develop rickets are: (1) deficient quality of milk from ill health, and malnutrition of the nursing mother or unduly prolonged lactation; (2) the substitution for the mother's milk of artificial foods which contain a high percentage of starch and too little fatty and proteid matter.

The symptoms develop gradually and almost imperceptibly. The child is restless at night and during sleep perspires profusely about the head and neck. It is very sensitive to pressure upon the limbs, often screaming when merely touched. The muscles are soft and flabby and gastric indigestion and intestinal disturbances set in, accompanied by swelling of the abdomen and colic. Characteristic and remarkable changes in the bones develop. The joints become thickened, and nodules form at the junction of the ribs with the costal cartilages, constituting what is called the 'rosary' or 'beading of the ribs.' Defective ossification is also seen in the skull, where the fontanelles are large and slow in closing. The teeth do not appear until the eleventh or twelfth month, instead of the sixth or seventh, and present many irregularities in the order of their eruption. As the disease progresses the bones grow softer and various deformities of the head, spine, limbs, chest, and pelvis are brought about by muscular contraction and the superincumbent weight of the body. The child becomes 'pigeon-breasted' and bow-legged. (See LEG.) The nervous system may be seriously affected, and rickety children are peculiarly liable to convulsions, and a spasmodic affection of the larynx known as *laryngismus stridulus*.

Rickets is a recoverable disease in the sense that it does not directly cause death and the process of bone-softening ceases after a time, although it may have produced permanent deformity. Rickety children are especially prone to severe bronchitic attacks by which death is often brought about. The treatment is essentially hygienic and dietetic. The child should be suitably clothed, and receive an abundant supply of fresh air and proper food. Starchy materials, for the digestion of which the infant's secretions are not yet prepared, should be excluded from the diet, and cow's milk, to which lime water and a little cream may be added, should constitute the sole food. As the infant approaches the second year, beef juice, chicken broth, or gravy may be added to the dietary, and at a later age a little meat, eggs, and custard may be given. The most valuable medicine is cod-liver oil, given two or three times a day after a meal, in doses proportioned to the child's age. Phosphorus, syrup of the iodide of iron, and preparations of lime such as the lacto-phosphate are also of value in certain cases. While the bones are soft walking should be discouraged. Deformities of the limbs remaining after the disease is cured may, if extreme, be remedied by surgical procedures.

RICK'ETTS, JAMES BREWERTON (1817-87). An American soldier, born in New York City. He graduated at West Point in 1839, and after receiving his commission as lieutenant of artillery served in the Mexican War. At the outbreak of the Civil War he participated in the defense of Washington and at Bull Run (July 21, 1861) was wounded and taken prisoner. On his release eight months later, he returned to duty with the grade of brigadier-general and took part in the second battle of Bull Run. Later he led a division in the Virginia and Maryland campaigns, and at Antietam lost a third of his troops. He participated in the Virginia campaign in the spring of 1864, but in July was ordered north to join in the defense of Washington, which was then threatened by General Early, and participated, under Sheridan, in the pursuit of Early through the Shenandoah Valley. At Cedar Creek (October 19, 1864), where he commanded a corps, he received a wound which disabled him for the winter. He was brevetted major-general in the Regular Army March 13, 1865, and from July, 1865, until April, 1866, when he was mustered out of the volunteer service, he commanded a district in Virginia. In January, 1867, he was retired from the regular service with the rank of major-general.

RICK'MAN, THOMAS (1776-?). An English architect and writer on architecture. He was professor of architecture in the Liverpool Academy, and is chiefly known from the fact that in his work, *Attempt to Discriminate the Styles of Architecture in England from the Conquest to the Reformation* (1817), he first gave to the periods of English mediæval architecture the names Norman, Early English, Decorated, and Perpendicular, which have been used ever since.

RICO, rē'kō, MARTIN (c.1850—). A Spanish landscape and marine painter, born in Madrid. He was a pupil of Federico de Madrazo in Madrid, where he obtained a scholarship which enabled him to study in Paris and Rome. There are two representative works by him in the Metropolitan Museum, New York City, "The Grand Canal, Venice," and an "Italian Garden." He painted in the manner of Fortuny. His pictures have fine architectural backgrounds, and his color is brilliant and pleasing. He received a second-class medal at the Paris Exposition of 1889, and the Legion of Honor in 1878.

RICOCHET, rĭk'ō-shā' (of uncertain etymology). In military fire tactics, this term describes a method of gun fire, in which the gun is fired at a low angle, and the missile rebounds from the flat surface over which it is traveling. In shelter trenches, rifle pits, redoubts, and other field fortifications rocks and stones are very carefully covered with earth to avoid the possibility of deflecting the enemy's fire. It has been found that many of the more serious rifle-shot wounds inflicted on both sides during the British-Boer War of 1899-1902 were the result of accidental ricochet fire, and not of explosive or dum-dum bullets, as at first charged. When spherical projectiles were used in naval guns they were allowed to strike short and ricochet rather than run any risk of going over the enemy, for spherical projectiles are not deflected laterally by striking the surface of water at a low angle, nor do they tend to rise after ricochet. Rifled projectiles are sharply de-

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flected upon striking water and they frequently rise from the water surface at an angle very much greater than the striking angle; consequently ricochet is avoided in modern gun fire. See GUNNERY.

RICORD, rê-kôr', or **RICARD**, JOHN. An American lawyer, said to have been a native of New York State, who went to Hawaii in October, 1843, and the next year was appointed Attorney-General of the island kingdom. In 1845 the Hawaiian Legislature authorized him to draft a series of acts organizing the five executive departments of the Government: Interior, Foreign Affairs, Finance, Public Instruction, and Attorney-General. It also adopted changes in the Constitution of 1840 affecting the Privy Council and the judiciary, which he proposed. In 1846 and 1847 it accepted the statute laws that he drew up, and these continued until the revolution to be the basis of Hawaii's civil code. His services in shaping Hawaiian institutions during their formative period were very valuable. He left the islands in 1847.

RICORD, PHILIPPE (1800-89). A French surgeon, born at Baltimore. He went in 1820 to Paris, where he was attached in succession to the Hôtel-Dieu under Dupuytren, and to the Pitié under Lisfranc. He graduated in medicine in 1826, and after practicing in the provinces, in 1828 he returned to Paris, where he delivered two annual courses of lectures at the Pitié on surgical operations, and was appointed surgeon-in-chief to the hospital for venereal diseases. This post he held with brilliant success till his retirement in October, 1860. He won a world-wide reputation in his specialty. In 1831 he became surgeon-in-chief of the Hospital du Midi in Paris. For his suggestions on the cure of varicocele and on the operation of urethro-plasty he received in 1842 one of the Montyon prizes. In 1862 he was appointed physician in ordinary to Napoleon III., and in 1869 consulting surgeon to the Emperor, having already on August 12, 1860, been raised to the distinction of commander of the Legion of Honor. In 1871 he was made, for his services in the ambulance corps during the siege of Paris, grand officer of the Legion of Honor. His works are numerous, the more important of them being: *De l'emploi du speculum* (1833); *Traité des maladies vénériennes* (1838); *Lettres sur la syphilis* (1851).

RIDDLE (AS. *rædels, rædelse*, from *rædan*, to council, interpret, read, Goth. *ga-rēdan*, OHG. *rātan*, Ger. *raten*, to council; perhaps connected with Lat. *reri*, to think, or with OChurch Slav. *raditi*, to be anxious, Skt. *rādh*, to be successful). The definition in obscure terms of a well-known object, which the person addressed is required to name. In modern times the enigma usually makes a witticism or pun; but anciently it had a character more serious. The themes of riddles were often natural objects, like the sun, moon, wind, or rainbow, and the presentation had something of a mythologic character. Knowledge of this sort was considered to imply a measure of wisdom which was in accordance with the early inclination to express truth in a mystical manner, rather than in straightforward and simple speech. Thus Samson, in order to show his intelligence, propounded a riddle to the Philistines. Riddle-guessing was often made to form a game, in which one side asked questions, and the other side responded; and such contest might be the subject of wagers. According to mythology the stake was often life or honor. Such was the case in the riddle proposed by the Sphinx to Œdipus: "What is that which has four feet in the morning, two at noon, and three at night?" to which the answer was: "Man." So Old Norse poetry makes Odin enter into a riddling contest with the giant Vafthrudnir, in which the latter perishes. In the Alvís-mâl, the prize of the contest is the daughter of the god Thor. Of these contests we have a survival in the English ballad of the Elfin-knight, where a maid saves herself from an evil spirit by guessing his riddles. So in modern nursery lore, a nurse will put to a child riddles to be guessed on penalty of a forfeit.

RID'DLE, ALBERT GALLATIN (1816-1902). An American lawyer and author, born in Monson, Mass. He was admitted to the bar in 1840, and in 1848-49 served in the State Legislature. In 1859 he defended the Oberlin slave-rescuers, and in 1861-63 was in Congress as a Republican. He was engaged by the State Department to assist in prosecuting John H. Surratt for his part in the assassination of President Lincoln. In 1877 he was appointed law-officer of the District of Columbia, and subsequently practiced at Washington. For a time he was head of the law department at Howard University. He wrote several stories of early Ohio life, such as *Bart Ridgely* (1873) and *The Sugar-Makers of the West Woods* (1885); a *Life of Benjamin F. Wade;* and *Recollections of War Times, 1860-65.*

RIDDLE, JOSEPH ESMOND (1804-59). An English divine and lexicographer. He was born at Bristol, educated at Saint Edmund Hall, Oxford, where he graduated in 1828, after which he resided at Ramsgate. Here he taught private pupils, prepared for his master's degree, and began the first of his important works in lexicography. After his ordination in 1830 he held many curacies, his last incumbency being Saint Peter and Saint James's, Leckhampton, Gloucester, which he held from 1840 until his death. He was select preacher at Oxford in 1834 and in 1854; and in 1852 he delivered the Bampton lectures, his theme being, *Natural History of Infidelity and Superstition in Contrast with Christian Faith.* He translated Scheller's *Lexicon Totius Latinitatis* (1835), published a *Complete English-Latin Dictionary* (1838), and *A Copious and Critical Latin-English Lexicon, founded on the Dictionaries of Dr. W. Freund* (1849). He was the author of a *History of the Papacy to the Period of the Reformation* (1854).

RIDDLE, MATTHEW BROWN (1836—). An American clergyman, educator, and author, born in Pittsburg, Pa. After his graduation at Jefferson College, Pa., in 1852, he studied theology at the New Brunswick Seminary and elsewhere until 1859, and then went to Heidelberg. He was adjunct professor of Greek in Jefferson College in 1857-58, had pastoral charges successively in two Dutch Reformed churches of New Jersey in 1861-69, and afterwards was appointed professor in the Hartford Theological Seminary, which he left in 1887 to take the chair of New Testament exegesis in the Western Theological Seminary, Allegheny, Pa. He was a member of the American committee for New Testament revision, was also a reviser of the Westminster Confession of Faith, and from 1877 to 1881 prepared *Notes on*

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the International Sunday-School Lessons (1877-81).

RIDEAU, rē'dō'. A waterway formed by the lake, river, and canal of the same name in the Province of Ontario, Canada (Map: Ontario, H 2). The lake is situated from 42 to 60 miles south-southwest of Ottawa, and is drained by the Rideau River, which falls into the Ottawa River at the city of Ottawa. The canal, built between 1826 and 1834 for military purposes, connects Ottawa with Kingston on Lake Ontario by way of the river and lake and by connections with Mud Lake and the Cataraqui River. It is 126¼ miles long, has a navigable depth of 4½ feet, and 47 locks. Its importance has declined since the advent of railways.

RIDEING, rīd'ing, WILLIAM HENRY (1853—). An American journalist and writer of books for young people, born in Liverpool, England. After coming to the United States he wrote for various newspapers until 1881, when he became a member of the editorial staff of the *Youth's Companion*. From 1887 to 1889 he was joint editor of the *North American Review*. His publications include: *A-Saddle in the Wild West* (1879); *Stray Moments with Thackeray* (1880); *Boys in the Mountains* (1882); *Boys Coastwise* (1884); *Thackeray's London* (1885); and *The Boyhood of Living Authors* (1887).

RIDER. An American political term denoting a legislative measure which, if left to stand alone, is likely to be rejected by one branch of the Legislature or vetoed by the President, but in order to be carried through is attached to an appropriation or other bill whose enactment is assured. The practice is an encroachment upon the independence of the executive, especially in the case of the President, who is not allowed to veto parts of an appropriation bill. In many of the States efforts have been made to abolish the practice by providing that no bill shall contain matter relating to more than one subject, which shall be indicated clearly in the title, and by providing further that the Governor may veto parts of an appropriation bill. A rule of the United States House of Representatives in 1888-89 prohibited the tacking of riders to appropriation bills.

RIDGAWAY, rij'a-wâ, HENRY BASCOM (1830-95). An American Methodist Episcopal minister and educator, born in Talbot County, Md., and educated at Dickinson College. After holding various pastorates he was appointed in 1882 professor in the Garrett Biblical Institute (Evanston, Ill.), of which he became president two years afterwards. He published biographies of *Alfred Cookman* (1871), *Bishop Edward S. Janes* (1882), *Bishop Beverly Waugh* (1883), and *Bishop Matthew Simpson* (1885).

RIDGE, MAJOR (c.1770-1839). A noted Cherokee chief, born at Hiwassee town, near the present Columbus, in East Tennessee. Having been formally initiated as a warrior at the age of twelve, he took an active part in the border warfare along the Tennessee frontier. Shortly after 1794 he was elected to a seat in the tribal council. He opposed cessions of tribal territory in 1804 and 1805, and took a firm stand against the doctrines of the Shawano prophet, who preached resistance to the Government. In the Creek War of 1813-14 he led a detachment of Cherokee volunteers to the aid of General Jackson, and rendered effective service, whence he was called Major. Together with 19 others, he signed the Treaty of New Echota, in 1835, which bound the entire Cherokee nation to remove beyond the Mississippi. The treaty was opposed by John Ross, and by the entire Cherokee council, but notwithstanding repeated protest it was carried through, and the entire tribe was deported to the Indian Territory, losing nearly 4000 by death in the journey, which occupied all of the winter of 1838-39. On June 22, 1839, a few months after their arrival, Major Ridge, his son John, and Elias Boudinot, three principal signers of the treaty, were killed at their homes by men sent for the purpose, in accordance with an old Cherokee law which fixed the death penalty for attempting to sell tribal lands without the consent of the entire nation.

RIDGE, WILLIAM PETT (c.1860—). An English novelist, born at Chartham, near Canterbury. He was educated in the Birkbeck Institute, lived in the country until 1880, and wrote nothing before 1890. Both in manner and in matter he follows Dickens, and is especially happy in portraying cockney humor. His books include: *A Clever Wife* (1895); *Secretary to Bayne, M. P.* (1897); *Mord Em'ly* (1898); *A Son of the State* (1899); *A Breaker of the Laws* (1900); *Outside the Radius* (1900); and *Lost Property* (1902).

RIDGWAY. A borough and the county-seat of Elk County, Pa., 119 miles east by south of Erie; on the Clarion River, and on the Pennsylvania and the Buffalo, Rochester and Pittsburg railroads (Map: Pennsylvania, C 2). The courthouse, representing an expenditure of $60,000, is a noteworthy feature of the borough. There is a public library. Ridgway is the centre of a lumbering and farming district, and is interested chiefly in manufacturing flour, leather, iron, clay, and lumber products, railroad snow plows, and machine tools. Population, in 1890, 1903; in 1900, 3515.

RIDGWAY, ROBERT (1850—). An American ornithologist, born in Mount Carmel, Ill. Through his early interest in birds he became, while a boy of fourteen, a correspondent of Spencer F. Baird, who recommended his appointment as zoölogist on the Clarence King geological exploration of the fortieth parallel (1867-69). In the report of the expedition published by the Government in 1877, Ridgway wrote the section on ornithology, and he had made collections not only of bird skins, nests, and eggs, but of reptiles and fishes observed between Sacramento Cal., and Salt Lake City, Utah. In 1880 he was appointed curator of the Division of Birds in the United States National Museum at Washington, and he became one of the founders, and afterwards president of the American Ornithologists' Union. He collaborated with Baird and Brewer by writing the technical parts in *A History of North American Birds* (3 vols., 1874) and in *The Water Birds of North America* (1884), and he classified the birds brought from Alaska by the Fish Commission in 1889. His other publications include: *A Nomenclature of Colors for Naturalists* (1886); *Manual of North American Birds* (1887); and *The Birds of North and Middle America*, in eight volumes, which began to appear in 1901. This work is

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scientifically the most important publication ever prepared for the region named, and one of the most valuable works on ornithology in existence.

RIDING. See HORSEMANSHIP.

RIDING (from Icel. *þriðjungr*, third part, from *þriði*, third, from *þrir*, three; the loss of the initial *th* is due to the faulty division of *North-thriding, South-thriding* as *North-riding, South-riding*), or TRITHING. A term applied to the three parts into which Yorkshire, England, is divided, termed respectively East, West, and North Riding. Other counties besides York had and still have subdivisions other than the common hundred. In Kent the hundreds are grouped together in Lathes or Lests; and in Sussex in Rapes. Lincolnshire, like Yorkshire, was formerly divided into Ridings. Consult Stubbs, *Constitutional History of England*, vol. i. (6th ed., Oxford, 1897).

RIDINGER, rē'dĭng-ẽr, JOHANN ELIAS (1698-1767). A famous German animal draughtsman, etcher, and painter. He was born at Ulm, was first instructed there by Christoph Resch, then studied under Johann Falk, and then under Rugendas in Augsburg. His hunting scenes were in great demand and in the representation of the stag no other artist could compete with him. A fine specimen of a "Stag Pursued by Dogs" is in the Cassel Gallery; the Grosvenor Gallery, London, has "Three Stags"; the Schwerin Gallery, "Bears in a Wilderness" (1710); but his oil paintings are very rare and he is best known through his drawings and etchings, a complete list and description of which may be found in the artist's *Life*, by Thienemann (with three supplements, Leipzig, 1856-76). His engraving of the "Lion Hunt," after Rubens, is in the Dresden Museum. His sons MARTIN ELIAS (1730-80) and JOHANN JAKOB (1735-84) engraved after his designs.

RID'LEY, NICHOLAS (c.1500-55). Bishop of London and one of the leading English reformers. He was educated at Pembroke Hall, Cambridge, at the Sorbonne, Paris, and at Louvain. He came under the notice of Archbishop Cranmer, and received various appointments from him. After 1536, the year of the death of his uncle Robert, who had paid the expenses of his education and who was an orthodox Roman Catholic, Ridley openly espoused the reformed faith. By the end of the reign of Henry VIII. he had renounced his belief in the doctrine of transubstantiation, and he influenced Cranmer in the same direction. During the reign of Edward VI. Ridley became very prominent. He was named Bishop of Rochester in 1547. He took part in the depositions of Bishops Bonner and Gardiner, and himself became in 1550 Bonner's successor as Bishop of London. He also took part in the first revision of the prayer-book in 1548, and assisted in drawing up the 41 articles, afterwards reduced to 39. On the death of Edward VI. he warmly espoused the cause of Lady Jane Grey (q.v.), but when this proved a speedy failure he was compelled to submit to Queen Mary. Ridley was at once committed to the Tower, and though every opportunity was given him to recant, he refused. In 1554 he was removed to Oxford for trial, found guilty in 1555 of the capital offense of heresy, and on October 16, 1555, he was burnt at the stake, together with Latimer, in front of Balliol College. Ridley's *Works*, which are chiefly polemical, have been published together with a *Life*, by Christmas, for the Packer Society (London, 1841).

RID'PATH, JOHN CLARK (1840-1900). An American historian and educator, born in Putnam County, Ind. He graduated at Asbury (now DePauw) University in 1859, taught at Thorntown Academy, Ind., and at Baker University, Baldwin City, Kan., and was elected in 1869 professor of English literature, in 1871 of belles-lettres and history, in Asbury University, of which he became vice-president ten years later. He resigned in 1885. His writings, chiefly popularizations of historical matter, are his *Academic History of the United States* (1874-75); *Popular History of the United States* (1877); *Grammar School History* (1876); *Inductive Grammar of the English Language* (1878-79); *Monograph on Alexander Hamilton* (1880); *Life and Work of Garfield* (1881-82); *Life of James G. Blaine* (1884); *History of Texas* (1884); *Cyclopædia of Universal History* (1880-85); *The Great Races of Mankind* (1892); *Christopher Columbus* (1890); a poem, *The Epic of Life* (1894); and one or two other volumes. He also compiled a *Library of Universal History*, and helped to edit the *People's Cyclopædia*. His last and probably most widely circulated work, a *History of the United States* (in 8 vols.), was completed shortly before his death.

RIEBECKITE, rē'bĕk-ĭt (named in honor of Emil *Riebeck*, a German traveler of the nineteenth century). One of the numerous varieties of amphibole. It is a sodium-iron silicate crystallizing in the monoclinic system, has a vitreous lustre, and is black in color. It occurs among the older rocks, such as granite and syenite, especially on the island of Socotra, in the Indian Ocean.

RIEDEL, rē'dĕl, KARL (1827-88). A German musician. He was born at Kronenberg, near Elberfeld, studied at Krefeld with Karl Wilhelm, and entered the conservatory at Leipzig, in which he became a teacher of piano and theory. In 1854 he established a society for the performance of ancient church music which became famous as the Riedel-Verein under his leadership and that of Kretschmar. Upon the death of Brendel, Riedel became president of the Allgemeiner deutscher Musikverein. His compositions, mostly chorales for male voices, are vigorous and original; but his real claim to fame rests on his gift of organization, his thoroughness, and especially his masterly editing of such old works as that of Prätorious, which he practically discovered.

RIEDESEL, rē'de-zĕl, FRIEDRICH ADOLPH, Baron (1738-1800). A German soldier in America, born at Lauterbach, Hesse. He studied at Marburg, served under Prince Ferdinand of Brunswick during the Seven Years' War, and in 1776 took command of 4000 Brunswick troops hired by Great Britain for service against the American colonies. He landed at Quebec in June, joined Burgoyne's expedition, fought bravely at the first battle of Saratoga (September 19, 1777), and surrendered with his commander (October 17th). He remained a prisoner for over two years together with his wife. He was exchanged in 1780, put in command of the British forces on Long Island, and returned to Germany in 1783. He was made a lieutenant-general in 1787, and commanded the Brunswickers in Holland. He died at Brunswick. His wife,

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FRIEDERIKE CHARLOTTE LUISE (1746-1808), came with her husband to America and left an interesting account of their American adventures. The *Memoirs, Letters, and Journals of Major-General Riedesel During His Residence in America* (Albany, 1868) and *Letters and Journals* by Lady Riedesel (ib., 1867), both translated and edited by Stone, are among the most valuable material for the history of Burgoyne's campaign.

RIEFSTAHL, rēf'stäl, WILHELM (1827-88). A German landscape, genre, and architectural painter, born at Neustrelitz, Mecklenburg. He was a pupil of Wilhelm Schirmer at the Berlin Academy, subsequently studied nature, traveling extensively, and visited Rome in 1869-70, 1874, and 1877. In 1870-73 he was professor at the School of Art in Karlsruhe and in 1875-77 its director, after which he settled in Munich. He at first painted landscape pure and simple, as finely exemplified by "Northern Heath" (1850), "Village Graveyard" (1854), and others, and afterwards supplied his scenery with figures, to which he gradually gave greater prominence, excelling in harmonious combinations of both. Admirable specimens of this kind are: "Devotions of Passeier Shepherds in the Fields" (1864, gold medal, Berlin), "All Souls' Day at Bregenz" (1869), "Missionaries in the Rhætian Alps" (1884), all in the National Gallery, Berlin; "Wedding Procession in Bavarian Alps" (1866), in Metropolitan Museum, New York; "Blessing of the Alps" (1881), Leipzig Museum. Reminiscent of Italy are "Funeral Procession in Front of the Pantheon" (1871), Dresden Museum; "Procession Through the Forum Romanum" (1879 and "The Anatomical Theatre at Bologna" (1880), Leipzig Museum; replica (1883), Dresden Museum. Consult: Berlepsch, in *Zeitschrift für bildende Kunst* (Leipzig, 1890); Holland, in *Allgemeine deutsche Biographie*, xxviii. (Leipzig, 1889); and Rosenberg, *Die Berliner Malerschule* (Berlin, 1879).

RIEGEL, rē'gel, HERMAN (1834-1900). A German art-historian, born at Potsdam. He gave up the study of law for that of art, was director of the museum and docent at the university in Leipzig in 1868-71, then became director of the museum and professor at the Polytechnicum in Brunswick. His highly valued writings comprise: *Cornelius, der Meister der deutschen Malerei* (1866); *Deutsche Kunststudien* (1868); *Italienische Blätter* (1871); *Geschichte des Wiederauflebens der deutschen Kunst*, etc. (1874-75); *Kunstgeschichtliche Vorträge und Aufsätze* (1877); *Beiträge zur niederländischen Kunstgeschichte* (1882); *Geschichte der Wandmalerei in Belgien seit 1856* (1882); *Die bildenden Künste* (1896); *Beiträge zur Kunstgeschichte Italiens* (1898).

RIEGER, rē'gēr, FRANZ LADISLAUS (1818-1903). A Bohemian statesman, born at Semil and educated for the bar at Prague. He entered the Government service, but his career was cut short, as he was prosecuted for his political ideas. The lawsuit increased his popularity, and in 1848 seven districts elected him Deputy. He became one of the leaders of the Slavic Party in the Austrian Reichsrat. During the reactionary period which followed the revolution he took no further part of importance in politics until 1860. In the meantime, he occupied himself with the pen as a political weapon, writing *Slaves d'Autriche* (1860), and with Kober founding the Bohemian encyclopædia, *Slovnik naučný* (1859-74). In 1861, with his father-in-law, the historian Palacky, he became a leader of the Czech National Party, both as a member of the Bohemian Diet and as a Deputy to the Vienna-Reichsrat. In 1863 he dictated the "policy of abstention," by which the Reichsrat was left without a Czech representation, and he thenceforth led, with the aid of the Ultramontanes and Feudalists, the agitation for Bohemian autonomy. During the Taaffe régime, after the Czechs had reëntered the Reichsrat, Rieger supported the Government, and became the head of the Old Czechs. His conservatism alienated the more radical wing of the national party (Young Czechs), who gradually gained supremacy, both in the Bohemian Diet and the Austrian Reichsrat. Toward the end of his life Rieger's influence on national affairs largely waned. In 1897 he was made a baron and called into the Austrian House of Peers.

RIEGO Y NUÑEZ, rē-ā'gō ē nōō'nyäth, RAFAEL DEL (1785-1823). A Spanish revolutionist, born at Oviedo, in Asturias. He joined in the patriot movement against France which followed the usurpation of the Spanish throne by Joseph Bonaparte. Captured by the French, he was a prisoner until 1814, when he visited Germany and England. He was leader of the military insurrection which broke out in January, 1820, and which brought about the restoration of the Spanish Constitution of 1812. He became field-marshal and Captain-General of Aragon, and in 1822 was president of the Cortes. He ardently opposed French intervention in 1823, met the soldiers of the Holy Alliance at the head of the Army of Malaga, was wounded, taken prisoner, and handed over to the royal authorities. He was tried as a traitor, and put to death at Madrid, November 7, 1823. A hymn which he wrote, called after him the "Hymn of Riego," became a popular revolutionary song, and is now the national anthem. Consult: Riego, *Memoirs of Riego and His Family* (London, 1824); Nard and Piral, *Vida militar e politica de Riego* (Madrid, 1844).

RIEHL, rēl, ALOIS (1844—). A German philosopher, born at Bozen, Tyrol. He studied at Vienna, Innsbruck, and Munich, and was appointed professor of philosophy at Gratz in 1873. Afterwards he held similar chairs at Freiburg, Keil, and Halle. Like Laas and Avenarius, he belongs to the German group of positivists. Riehl is well known as a logician, as a critic of modern English logic, and as author of *Beiträge zur Logik* (1892). His philosophical criticism is to be found in *Der philosophische Kritizismus* (1876-87); *Moral und Dogma* (1871); *Ueber wissenschaftliche und nichtwissenschaftliche Philosophie* (1883); *Bruno* (1889; 2d ed. 1900); *Fr. Nietzsche* (1897; 3d ed. 1901); and *Zur Einführung in die Philosophie der Gegenwart* (1903).

RIEHL, WILHELM HEINRICH (1823-97). A German historian of civilization and novelist, born at Biebrich, and educated at Marburg, Tübingen, Bonn, and Geissen. In 1846 he entered journalism on the staff of the *Karlsruher Zeitung;* then founded the *Badischer Landtagsbote;* and after his election to the German

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National Assembly in 1848, edited the *Nassauische allgemeine Zeitung*. In 1854 he went to Munich as professor of economics, and five years afterwards was transferred to a chair of history of literature. He is better known as the author of valuable sketches of the history of civilization, and of novels and tales based on these same historical studies, but of such literary excellence that in the short story he ranks only below Heyse among modern German writers. Riehl's works include *Naturgeschichte des Volkes* (1851-69; in many editions); *Die Pfälzer* (1857); *Kulturstudien aus drei Jahrhunderten* (1859; 5th ed., 1896); *Musikalische Charakterköpfe* (1853-77); *Aus der Ecke* (1875); 3d ed. 1890); *Lebensrätsel* (1888); *Religiöse Studien eines Weltkindes* (1894); and posthumously a romance, *Ein ganzer Mann* (1897).

RIEL, rē-ĕl', Louis (1844-85). Leader of the so-called 'Riel's Rebellion' in Canada. He was born at Saint Boniface, Manitoba, and was of Indian and French-Canadian descent. He is said to have been educated for the priesthood in a Roman Catholic seminary at Quebec, but he did not take orders. He first came into prominence as the leader of the rebellion that broke out in 1869. In that year upon the purchase of the Northwest Territory from the Hudson's Bay Company by the Canadian Government the 'metis,' or half-breeds, of that section became alarmed lest they should lose some of their rights, and especially the title to their lands, and formed a 'council' to insist upon their claims. Of this 'council' Riel was secretary and John Bruce president; but Riel was the actual leader of the movement. On November 2d the malcontents refused to allow William McDougall, who had been appointed Lieutenant-Governor, to enter the Territory, and on the same day Riel took possession of Fort Garry. The 'council' then issued a proclamation to the settlers calling upon them to send representatives to a convention, which on December 1 issued a 'Bill of Rights,' and later formed a provisional Government, of which Riel became President. A considerable number of persons who opposed the new Government were seized and imprisoned, and by Riel's order one of these, named Thomas Scott, was executed. Attempts at a peaceful settlement of the difficulties having failed, the Dominion Government determined to put down the rebellion by force of arms. Accordingly, in the summer of 1870 Colonel Wolseley (afterwards Sir Garnet Wolseley, commander-in-chief of the British Army) was dispatched with a force of about 1400 men to the seat of trouble. Finding resistance hopeless, Riel and some of his associates fled to the United States, where he remained for some time. In 1873 and again in 1874, his friends elected him to the Dominion Parliament for the district of Provencher, and in the latter year, despite the fact that a reward of $5000 had been offered for his capture, he attempted to take his seat, but was expelled, and in October a warrant of outlawry was issued against him. In 1877 he was confined for a time in a lunatic asylum in Quebec, but the next year he was again at large and is thought by some to have entered into a conspiracy with the Fenians for the conquest of the Northwest. Later he went to Montana, whence in 1884 he was invited by French half-breeds living near the forks of the Saskatchewan to come and assist them in forcing the Government to settle their claims to certain land grants and to give them certain other rights. Riel accepted their invitation, and in the following March was made President of the provisional Government, which was established at Saint Laurent. Troops, however, were dispatched against the rebels, and the main stronghold at Batoche was taken by General Middleton. Riel himself was soon afterwards captured, and in July was brought to trial at Regina for high treason. His lawyers pleaded in his defense that he was insane, and this plea was to a certain extent borne out by peculiar religious ideas that he had announced; but he was nevertheless condemned to death, and on November 16, 1885, was hanged. Consult Begg, *History of the Red River Troubles* (Toronto, 1871), and the same author's *History of the Northwest* (ib., 1895).

RIEMANN, rē'mân, Georg Friedrich Bernhard (1826-66). One of the foremost German mathematicians of the nineteenth century, particularly in the field of geometry. He was born at Breselenz, near Dannenberg, in Hanover. He studied mathematics at Göttingen and Berlin, and received his doctor's degree at the former university in 1851, his thesis being a well-known contribution to the theory of functions, *Grundlagen für allgemeine Theorie der Funktionen einer veränderlichen complexen Grösse*. Three years later he was made privat-docent at Göttingen, then (1857) adjunct professor, and finally (1859), on the death of Dirichlet, full professor. His introduction of the notion of geometric order into the theory of Abelian functions, and his invention of the surfaces which bear his name, led to great and rapid advance in the function theory. To him, also, is due (1854) a new system of non-Euclidean geometry, ranking with that of Lobatchevsky and Bolyai (see Geometry), a system which he made known in his thesis, *Ueber die Hypothesen, welche der Geometrie zu Grunde liegen* (published posthumously, Leipzig, 1867). Riemann's writings, besides those already mentioned, are: *Vorlesungen über Schwere, Elektrizität und Magnetismus* (1876; 2d ed. 1880, both posthumous); *Partielle Differentialgleichungen* (1869; 4th ed. 1900-01, both posthumous); *Mechanik des Ohres; Elliptische Functionen, Vorlesungen mit Zusätzen* (1899); and his *Gesammelte mathematische Werke und wissenschaftlicher Nachlass*, edited by H. Weber and Dedekind (1876; 2d ed. 1892; French trans., 1898). He also contributed several memoirs on surfaces, which were published in the *Annalen* and in *Crelle's Journal*. For the life of Riemann, consult his *Gesammelte Werke;* Schering, *Bernhard Riemann, zum Gedächtniss*. For an elementary explanation of Riemann's surfaces, consult: Durège, *Theory of Functions* (Eng. trans., Philadelphia, 1896); Holzmüller, *Einführung in die Theorie der isogonalen Verwandtschaften und der Conformal-Abbildungen* (Leipzig, 1882).

RIEMANN, Hugo (1849—). A German writer on music, born at Grossmehlra, near Sondershausen. He was educated in theory by Frankenberger, studied the piano with Barthel and Ratzenberger, studied law, and finally philosophy and history at Berlin and Tübingen. After serving in the Franco-German war he entered the Leipzig Conservatory. Both as conductor and teacher at Bielefeld, he was most

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active until 1878, when he became university lecturer on music at Leipzig. As the much-desired appointment at the Conservatory did not follow, he went, in 1880, as teacher of music to Bromberg; and, from 1881 to 1890, was teacher at the Hamburg Conservatory. After a short career at the Sondershausen Conservatory he went, in 1890, to the Conservatory at Wiesbaden. Near the close of 1895 he returned to Leipzig as lecturer at the university. In 1901 he became professor. Besides composing many pianoforte pieces, songs, a pianoforte sonata, six sonatinas, a violin sonata, and a quartet for strings, he furnished after 1870 many critical, æsthetical, theoretical, and historical papers for journals. He also compiled a popular and eminently sound *Musik-Lexikon* (1882; 5th ed. 1899; Eng, trans., 1893-96).

RIEMENSCHNEIDER, rē'men-shnī'dēr, TILMAN (c.1460-1531). A German sculptor of the Renaissance. He was born at Osterode, in the Harz Mountains, and in 1483 appears at Würzburg as a journeyman carver. He soon became one of the most influential citizens, being elected Burgomaster in 1520. In the religous troubles during the following years Riemenschneider was the head of the reforming element and sided with the peasants during the Peasant War. When the reaction came in 1525 he was expelled from the council, and from this time until his death in 1531 he lived in retirement. His principal works include the monument to Eberhard of Grumbach, in the Church of Rimpar (near Würzburg); "Adam and Eve" (1493) on the south portal of the Liebfrauenkirche at Würzburg, and the statues of Christ, John the Baptist, and the Apostles on the buttresses of the same church (1500-06); a Madonna and the tomb of John Trithemius in the Neumünsterkirche (1493); the portrait statues of the Bishops Rudolf of Scheerenburg and Lorenz von Bibra in the Cathedral. His masterpiece is the monument to the Emperor Henry II. and his wife Kunigunde in the Bamberg Cathedral (1495-1513). Other well-known works are the "Bewailing of the Body of Christ" (1508), a group in the church of Heidingsfeld, and his last work (1505), a high relief of the same subject in the church of Maidbrunn.

Consult his biography by K. Becker (Leipzig, 1849), and A. Weber (Würzburg, 1888), and the heliotype edition of his works by Streit (Berlin, 1888).

RIEMER, rē'mēr, FRIEDRICH WILHELM (1774-1845). A German scholar and literary historian, born at Glatz. He studied theology and philology at Halle, was a tutor in the family of Wilhelm von Humboldt (1801-03), and then for nine years lived with Goethe as his literary assistant and his son's tutor. In 1812 he became professor at the Weimar gymnasium; from 1814 to 1820 he was assistant librarian, and from 1837 to his death he was librarian-in-chief at Weimar. Riemer published some poetry, a Greek lexicon (1802-04), and *Mitteilungen über Goethe* (1841). He edited Goethe's correspondence with Zelter (1833-34), and his own letters were published in two volumes, *Briefe von und an Goethe* (1846) and in *Aus dem Goethehause* (1892, edited by Heitmüller).

RIENZI, rē-ĕn'zē, COLA DI (c.1313-54). A Roman popular leader. He was born at Rome. Until his twentieth year he lived among the peasants of Anagni; then he returned to his native city, where he studied grammar and rhetoric and read the Latin classics. The assassination of his brother by a Roman noble finally determined him to deliver the city from the barbarous thralldom of the barons. He assumed the significant title of 'consul of orphans, widows, and the poor.' In 1343 he was appointed by the heads of the Guelph party spokesman or orator of a deputation sent to the Papal Court at Avignon to beseech Clement VI. to return to Rome in order to protect the citizens from the tyranny of their oppressors. Here he formed a close friendship with Petrarch, through whose assistance he obtained a favorable hearing from his Holiness, who appointed him notary to the city chamber. In April, 1344, Rienzi returned to Rome; but reform, he found, was impossible without revolution. During three years he loudly and openly menaced the nobles, who, thinking him mad, took no steps to crush him. At last on May 20, 1347, surrounded by 100 horsemen and accompanied by the Papal legate, Rienzi delivered a magnificent discourse and proposed a series of laws for the better government of the community, which were unanimously approved. The aristocratic senators were driven out of the city, and Rienzi took the title of 'tribune of liberty, peace, and justice,' and chose the Papal legate for his colleague.

Rienzi dispatched messengers to the various Italian States, requesting them to send deputies to Rome to consult for the general interests of the peninsula, and to devise measures for its unification. These messengers were everywhere received with enthusiasm, and on August 1, 1347, 200 deputies assembled in the Lateran Church, where Rienzi declared that the choice of an Emperor of the Holy Roman Empire belonged to the Roman people, and summoned Louis the Bavarian and Charles of Luxemburg, who were then disputants for the dignity, to appear before him. The step was wildly impolitic. The Pope was indignant at the transference of authority from himself to his subjects; and the barons gathered together their forces and renewed their devastations. After ineffectual resistance Rienzi resigned his functions and withdrew from Rome. His tenure of power had lasted only seven months. In the solitudes of the Neapolitan Apennines, Rienzi joined an Order of Franciscan hermits, and spent nearly two years in exercises of piety and penitence—all the while, however, cherishing the hope that he would one day 'deliver' Rome again. This ambition made him readily listen to a brother monk, who declared that Rienzi was destined, by the help of the Emperor Charles IV., to introduce a new era of happiness into the world. Rienzi betook himself at once to Prague, and announced to the Emperor that in a year and a half a new hierarchy would be established in the Church, and under a new Pope Charles would reign in the west and Rienzi in the east. Charles put the 'prophet' in prison, and then informed the Pope of the matter. In July, 1351, Rienzi was transferred to Avignon, where proceedings were opened against him, and he was condemned to death, but his life was spared and the next two years were spent in easy confinement in the French Papal city.

Meanwhile at Rome the great families were

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more factious, more anarchical, more desperately fond of spilling blood than ever; and at last Innocent VI. sent Cardinal Albornoz to reëstablish order. Rienzi was released from prison, and accompanied the Cardinal. In August, 1354, having borrowed money and raised a small body of soldiers, he made a sort of triumphal entry into Rome, and was received with universal acclamations. But misfortune had debased his character; he abandoned himself to good living, and his once generous sentiments had given place to a hard, mistrustful, and cruel disposition. The barons refused to recognize his government and fortified themselves in their castles. The war against them necessitated the incurring of heavy expenses. In two months, Rienzi's rule becoming intolerable, an infuriated crowd surrounded him in the Capitol and put him to death. Consult: Papencordt, *Cola di Rienzo und seine Zeit* (Hamburg, 1841); Auriac, *Etude historique sur Nicole Rienzo* (Paris, 1888); Rodocanachi, *Cola di Rienzo* (ib., 1888).

RIENZI, DER LETZTE DER TRIBUNEN. An opera in five acts, text and music by Richard Wagner, first produced at Dresden, October 20, 1842. The libretto is founded upon Bulwer's novel of the same title, whose story it follows in the essential particulars. It is the last of Wagner's works in the purely operatic style, for thereafter, in the *Flying Dutchman*, *Tannhäuser*, *Lohengrin*, and the *Ring*, Wagner adhered more and more rigidly to his music-drama principles. The music is characterized by melody, and a series of dramatic climaxes whose treatment is reminiscent of the Meyerbeer school.

RIEPENHAUSEN, rē'pen-hou'zen, FRANZ (1786-1831) and JOHANNES (1789-1860). German painters and engravers, born at Göttingen, sons and pupils of Ernst Ludwig Riepenhausen (1765-1840, favorably known through his engravings after Hogarth). In 1804 they studied under Tischbein at the Academy in Cassel, then in Dresden, and in 1807 went in Tieck's company to Rome, where they settled permanently and devoted themselves chiefly to the study of Raphael's works. Besides many religious paintings they produced conjointly the "Glorification of Raphael," and for the Guelph Hall at Hanover "Henry the Lion Protecting Frederick Barbarossa Against the Romans." They also collaborated in drawings to Goethe's *Faust*, in episodes from the life of Charlemagne, in 14 etchings, illustrating the "Life and Death of Saint Genevieve" (1806), a *Geschichte der Malerei in Italien*, with 24 outline drawings after Italian masters before Perugino (1810), and a series of drawings after the paintings of Polygnotus at Delphi, according to Pausanias. After the death of Franz, Johannes published a "Vita di Raffaello" in 14 plates, for which they had composed the drawings together, and also executed several large paintings such as "Raphael's Death" (1836), "Destruction of the Cenci Family" (1839), and others. Consult Andresen, *Die deutschen Maler-Radirer des neunzehnten Jahrhunderts* (Leipzig, 1872).

RIES, rēs, FERDINAND (1784-1838). A German composer, born at Bonn. He was the eldest son of Franz Ries (1755-1846), a musical director at Bonn. He studied piano with Beethoven, his father's friend, from 1801 to 1805 at Vienna, and became prominent by his compositions and by his *Biographische Notizen über L. Beethoven* (1838). As a pianist he was most successful in his many concert tours through England, France, Russia, and Scandinavia. He was town musical director at Aix-la-Chapelle from 1834 to 1836. He wrote three operas: *Die Räuberbraut* (1828), *Liska* (1831), and *Eine Nacht auf dem Libanon;* two oratorios, *Der Sieg des Glaubens* and *Die Könige Israels;* overtures, symphonies, string quartets, violin sonatas, and a trio for two pianos and a harp.

RIESA, rē'zä. A town and railway centre in Saxony, on the Elbe, 33 miles by rail northwest of Dresden. A large bridge of iron and stone here spans the river (Map: Germany, E 3). The town has a public library and a municipal hospital, and various special schools. The harbor is good and possesses ample shipping facilities, and Riesa is consequently the centre of important shipbuilding interests and of a large trade, including fish, oil, coal, lumber, grain, iron ore, etc. Sandstone, which is quarried extensively, is also shipped. There are rolling mills and many other manufactories. Population, in 1900, 13,477.

RIESE, rē'ze, ALEXANDER (1840—). A German classical scholar, born and educated at Frankfort-on-the-Main. Besides his excellent editions of Varro's *Satiræ Menippeæ* (1865), of the *Anthologia Latina* (1869-70; 2d ed. 1894), of Ovid (1871-77), of the *Historia Apollonii Regis Tyri* (1871, 2d ed. 1893), of Catullus (1884, with commentary), and of Phædrus (1885), he published a suggestive essay, *Idealisierung der Naturvölker des Nordens in den griechischen und römischen Litteraturen* (1875), and two monographs on early German history, *Das Rheinland in der Römerzeit* (1889) and *Das Rheinische Germanien in der antiken Litteratur* (1892).

RIESENER, rē'ze-nĕr, JOHANN HEINRICH (1734-1806). A German cabinet-maker, born at Gladbach, Rhenish Prussia. Early in life he went to Paris and entered the workshop of Johann Franz Oeben (died 1766, a pupil of Boulle and protégé of Madame de Pompadour), after whose death he married his widow, carried on his business and was received as master into the Paris guild in 1768. Specimens of Riesener's work, in the style of Louis XV., executed for the royal palaces, may be seen at Fontainebleau, Trianon, Compiègne, and in the Musée du Mobilier National, Paris, while the majority of it was sold abroad, particularly into England, in consequence of the Revolution.

RIESENGEBIRGE, rē'zen-ge-bêr'ge (Ger., giant mountains). The highest range of the Sudetic Mountains (q.v.).

RIESI, rē-ä'zē. A town in the Province of Caltanissetta, Sicily, situated near the Salso, 14½ miles south of Caltanissetta (Map: Italy, J 10). There are sulphur mines and a trade in wine and olive oil. Population (commune), in 1901, 14,944.

RIETI, rē-ä'tē. A town in the Province of Perugia, Italy, situated on the Velino, 45 miles northeast of Rome (Map: Italy, G 5). It is well built and surrounded by walls. The fifteenth-century cathedral has a monument by Thorvaldsen. There are an old castle, a bishop's seminary, a gymnasium, a lyceum, a technical

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school, and a public library of 30,000 volumes. The chief trade is in wine, oil, and fruit. Rieti, the ancient *Reate*, was a noted city of the Sabines. Population (commune), in 1901, 17,977.

RIETSCHEL, rēch'el, ERNST (1804-61). An eminent German sculptor, founder of the Dresden school of plastic art. Born at Pulsnitz, Saxon Lusatia, December 15, 1804, he underwent the severest privations in his youth, and began his artistic training at the Dresden Academy, in 1820, still contending with extreme poverty, until he won prizes for his drawings, which were, moreover, bought for the academy as models to be copied. In 1826 he became the pupil of Rauch, in Berlin, and in 1827 was granted a stipend by the Saxon Government, of which, however, he did not avail himself for the purpose of visiting Italy until 1830, after having assisted his master in the completion of various works, notably of the monument to King Max I. at Munich, in 1829. From Italy he returned to Berlin in 1831, and in 1832 was appointed professor at the academy in Dresden, where he resided until his death, February 21, 1861.

Rietschel's first work of importance was the "Monument of King Frederick Augustus I." (1829-39), in the Zwinger at Dresden, but simultaneously he worked on the twelve great reliefs, illustrative of the "Main Epochs of Civilization" (1835-38), in the Aula of Leipzig University. Next came the admirable group in high relief, in the pediment of the Opera House in Berlin (1844), with the "Muse of Music" in the centre, and from about the same time dates "The Christ Angel," a beautiful relief, widely known through reproductions, and presented by the master to the Art Union of Dresden. The first work to give evidence of Rietschel's accomplished mastership, and to demonstrate his peculiar tendency in art, was the famous "Pietà" (c.1847), constituting the finest ornament of the Friedenskirche at Potsdam. Among his best creations are to be numbered the statues of "Thaer," the agriculturist (1850), at Leipzig, and of "Lessing" (1853), at Brunswick, a truly classical example of realistic portrait sculpture. In 1852 he began the "Emblematic Sculptures" on the exterior of the Dresden Museum, the cornice of which he also adorned with statues of "Pericles," "Phidias," "Giotto," "Dürer," "Holbein," and "Goethe." In the meanwhile he also modeled the heroic-size "Goethe-Schiller Monument" (erected 1857) for Weimar, and in 1857 fashioned his celebrated bust of "Rauch," unsurpassed probably by any portrait bust of the century. This was followed by the "Quadriga" (1860), with the magnificent figure of "Brunonia," for the ducal palace at Brunswick, executed in copper by Howaldt. In the same year was unveiled the masterly statue of "Weber" at Dresden. For the Walhalla, Regensburg, he executed the busts of "Luther," "Elector Augustus II.," besides other busts and relief portraits. Of his last and most elaborate production, the "Luther Monument" at Worms, he was only able to finish the figures of Luther and Wiclif, while the completion of his design was intrusted to his pupils Donndorf and Kietz (1868). A collection of casts and models of all his works is preserved in the Rietschel Museum at Dresden. Consult his *Autobiography*, edited and supplemented by Oppermann (Leipzig, 1873); Pecht, *Deutsche Künstler*, i. (Nördlingen, 1877); and *Briefwechsel zwischen Rauch und Rietschel* (Berlin, 1890-91).

RIETZ, rēts, JULIUS (1812-77). A German conductor and composer, born in Berlin. He studied the 'cello under Schmidt, Bernhard Romberg, and Gans; and when sixteen years old, joined the orchestra of the Königstädter Theater, for which he wrote the music to Holtei's play *Lorbeerbaum und Bettelstab*. In 1834 he was appointed assistant conductor at the Düsseldorf Opera under Mendelssohn, whom he succeeded the following year. In 1847 he was called to Leipzig as theatre kapellmeister and conductor of the Singakademie. In 1848 he succeeded Mendelssohn as conductor of the Gewandhaus concerts and as teacher of composition at the Conservatory. He was called to Dresden in 1860 to succeed Reissiger as Court kapellmeister. Here he conducted the opera and afterwards undertook the direction of the Royal Conservatory. As a composer he belongs to the younger classic school and was strongly opposed to the Neo-German movement. Among his works are the operas, *Das Mädchen aus der Fremde* (1833) and *Jery und Bätely* (c.1840); three symphonies, several overtures to plays, flute sonatas, violin sonatas, motets, masses, psalms, and a quantity of other church music. He died at Dresden.

RIEZLER, rēts'lēr, SIEGMUND VON (1843—). A German historian, born in Munich. He was educated there, became a docent in 1869, and after ten years as head of the archives and library of Donaueschingen was made court and city librarian in Munich, in 1883, and director of the Maximilianeum in 1885. His works, dealing for the most part with Bavarian history, include: *Das Herzogtum Bayern zur Zeit Heinrichs des Löwen* (1867, with Heigel), *Der Kreuzzug Kaiser Friedrichs I.* (1870), the great *Geschichte Bayerns* (1878-99), *Die bayrische Politik im Schmalkaldischen Kriege* (1895), and *Geschichte der Hexenprozesse in Bayern* (1896).

RIFF, THE (Er-Rif). A name given to the mountain region bordering the north coast of Morocco from Ceuta eastward nearly to the borders of Algeria and included in the Atlas system. The rugged coast, the principal projection of which is Cape Tres Forcas, is almost without harbors. The inhabitants are pure Berbers in blood. In the French conquest of Algeria they were not molested, and they are said to live in a state of chronic revolt against the Sultan of Morocco. They were formerly noted for piracy. The people understand or speak Arabic only to a very slight extent, Shleh or Shluh being their native tongue. They are said to be untrustworthy.

RIFLE-BIRD, or RIFLEMAN. An Australian bird of paradise (*Ptiloris paradiseus*), with a long curved bill, and in size about equal to a large pigeon. The upper parts are velvety black, tinged with purple; the under parts velvety black, diversified with olive-green. The crown of the head and the throat are covered with innumerable little specks of emerald green, of most brilliant lustre. The tail is black, the two central feathers rich metallic green. The female is much more plainly colored. The name was given by early Australian settlers in allusion to the resemblance between the plumage of the male and the uniform of a familiar rifle brigade.

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RIFLEMAN AND RIFLE CORPS. Formerly, the term rifleman designated an infantry soldier armed and equipped so as to be capable of greater mobility and more effective marksmanship than was possible with the ordinary infantry soldiers of the line. Modern conditions, however, demand that all regiments alike possess these qualities, so that, with the exception of uniform, the rifleman of to-day differs in no material way from his comrade in the line. Throughout the armies of Europe the rifle regiments are dressed in uniforms of black, dark green, or some other shade of inconspicuous color. In England, the Rifle Brigade, King's Royal Rifles, Irish Rifles, and Scottish Rifles (see CAMERONIANS) constitute the entire rifle establishment of the Regular Army, and are all distinguished by their dark green uniforms, varied only by the facings, or the tartan trews of the Cameronians. The term rifleman is frequently used as being synonymous with sharpshooter (q.v.), but such is no longer the case. When in 1779 the volunteer citizen soldier became an integral factor in English national defense, he was spoken of as a rifleman, and his regiment as a volunteer corps. His uniform was gray, the particular shade of which has since been known as rifle-gray.

In the United States Army, the preëminent characteristics of the soldier, whether mounted or dismounted, have ever been those of the rifleman. The tactics employed by the Colonials against the British were later developed by long experience in Indian fighting, so that the ability to skirmish and shoot became marked characteristics of the frontier soldier. The mounted rifleman is a product of comparatively recent military development. See MOUNTED INFANTRY.

RIFLING. See ORDNANCE; SMALL ARMS.

RIFT VALLEY. A depression in the earth's crusts formed by a vertical displacement of the strata. In some instances there is a single line of displacement, along which the strata on one side have been depressed, but quite often there are a series of faults running in parallel directions and dividing the strata into blocks which show the effects of differential movement. The depressions thus formed may be occupied by rivers or lakes and in time they lose their characteristic sharp contours, taking on the appearance of ordinary erosional valleys. Rift valleys are common in mountainous districts all over the world. The Great Basin region, particularly in southeastern Oregon, affords many fine examples and those occupied by the great lakes of Central Africa are especially noteworthy.

RIG (of a vessel). See SHIP.

RIGA, rē'gȧ. A seaport of Russia, capital of the Government of Livonia and the seat of the Governor-General of the Baltic Provinces, situated on the Düna, about 10 miles above its mouth in the Gulf of Riga, 363 miles southwest of Saint Petersburg (Map: Russia, B 3). The old town on the right bank of the Düna has the appearance of a mediæval German town, while the suburbs, which contain the bulk of the population, are largely modern. Riga possesses comparatively few ancient buildings. There may be noted the Domkirche, founded originally in the thirteenth century, but rebuilt in the sixteenth and containing one of the largest organs in the world; and the Church of Saint Peter, with a steeple 440 feet high.

The castle, now the residence of the Governor-General and the seat of the administration, the house of the Black Heads, the exchange, the guild houses, and the theatre may also be mentioned. Riga is better provided with educational and charitable institutions than most Russian cities. It has a polytechnicum with over 1400 students, a seminary for priests, a school of navigation, and a municipal museum. It occupies the third rank among the seaports of Russia and the second among the Baltic seaports.

Riga is also an important industrial centre. The chief manufactures are machinery, railway cars, lumber, leather, candles, tiles, glass, tobacco products, etc., the annual value of its manufactures exceeding $30,000,000. The principal harbors of Riga are those at the mouth of the Düna and the Mühlgraben, nearer to the city. Lighter craft go up to the city by the canalized river. The harbor is frozen for a considerable part of the year and is not well protected. Riga has latterly grown in commercial importance. The average value of its annual exports rose from about $26,000,000 for the period of 1891-95 to over $35,000,000 for the period of 1896-1900; while the imports increased from about $13,000,000 in 1891-95 to nearly $27,000,000 in 1896-1900. The principal exports are cereals, flax and flaxseed, eggs, and lumber; and the chief imports, machinery, cotton, coal, and groceries. The population rose from 169,329 in 1881 to 282,943 in 1897. About 50 per cent. of the population is German.

Riga was founded by Albert L. Bishop, of Livonia, in 1201. An episcopal see was established here, which soon was erected into an archbishopric. The town attracted many colonists from Germany on account of the commercial privileges granted to it by its founder, and became a flourishing member of the Hanseatic League. Its burghers were involved in conflicts with the archbishops, who sought to hold the city under their temporal power, and with the Teutonic Knights. About the middle of the sixteenth century Riga passed into the possession of the King of Poland. Soon after the archbishopric was abolished. In 1621 the city was taken after a long siege by Gustavus Adolphus of Sweden. It passed to Russia in 1710. Consult: Neumann, *Das mittelalterliche Riga* (Berlin, 1892); Tobien, *Ergebnisse der Rigaer Handelstatistik, 1866-91* (Riga, 1893); Mettig, *Geschichte der Stadt Riga* (Riga, 1895); *Der Stadt Riga* (Riga, 1901).

RIGA, GULF OF. An inlet of the Baltic Sea, extending in a southerly direction between the governments of Esthonia, Livonia, and Courland (Map: Russia, B 3). It is about 100 miles long and over 70 miles wide. Its water is less salty than that of the Baltic Sea. The gulf never freezes over entirely and is ice free for about two-thirds of the year along the coast. At its southeastern corner it receives the River Düna. At the entrance to the gulf lie the islands of Oesel, Dago, and Mohn.

RIGAS, or **RHIGAS,** rē'gȧs, KONSTANTINOS (1754-98). A Greek patriot and poet, born at Velestinos (ancient Pheræ). Until 1790 he was in the employ of the Hospodar of Wallachia and then, joining the revolutionary party, attempted, first to form an anti-Turkish committee in

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Vienna, and then at Venice to influence Bonaparte in behalf of Hellenic independence. He was imprisoned by the Austrians and surrendered to the Turks, who executed him at Belgrade. His collected songs were published in 1814 and the Greek paraphrase of the *Marseillaise* is attributed to him. Consult the *Life* by Perrhaivos (Athens, 1860).

RIGADOON (Fr. *rigodon, rigandon*, said to be named after *Rigand*, a French dancing master). A lively dance of French origin. It was popular in the time of Louis XIII., and was introduced into England toward the last of the seventeenth century. The rigadoon had an unusual jumping step, and the music in $\frac{2}{4}$, or common time, was spirited.

RIGAUD, rē'gō', STEPHEN PETER (1774-1839). An English astronomer and historian of mathematics. He was born at Richmond in Surrey, of Huguenot refugees, and was educated at Exeter College, Oxford, where he became lecturer on experimental philosophy and Savilian professor of geometry in 1810. He succeeded his father as observer to the King at Kew (1814) and followed Abraham Robertson as Savilian professor of astronomy in 1827. In Radcliffe Observatory, which came under his charge at this time, he discovered important manuscripts of Bradley and of Harriot and many other papers. Rigaud published: *The Miscellaneous Works and Correspondence of Dr. Bradley* (1831, with memoir; 2d ed. 1833), *An Historical Essay on the First Publication of Newton's 'Principia'* (1838); and *The Correspondence of Scientific Men of the Seventeenth Century* (1841, edited by his son; reëdited by De Morgan, 1862).

RIG'BY, ELIZABETH. The maiden name of the English author Lady Elizabeth Eastlake (q.v.).

RIG'DON, SIDNEY (1793-1876). A Mormon elder. He was born in Saint Clair township, Allegheny County, Pa. He was pastor of a Baptist church in Pittsburg (1822) and afterwards was a minister of the Disciples' Church in Ohio. It has been claimed that here he became acquainted with a romance of prehistoric America, written in 1812 by Solomon Spaulding, an eccentric Congregational minister in Ohio, and that this was the 'source, root, and inspiration' of the Book of Mormon. The claim has not been substantiated, and there is no positive evidence against the statement of Joseph Smith that he met Rigdon for the first time in December, 1830. Rigdon was closely associated with Smith after the latter's removal to Ohio (1831), and accompanied him to Missouri and Nauvoo, where he was one of the three presidents of the new Church. He refused to acknowledge the authority of Brigham Young after the death of Smith, was excommunicated for contumacy, and returned to Pittsburg, but never gave up his Mormon faith. He died at Friendship, N. Y.

RIGG, JAMES HARRISON (1821—). An English clergyman and educator, born at Newcastle-on-Tyne. He was educated at Old Kingswood School and entered the Wesleyan Methodist Ministry in 1845. In 1868 he became principal of the Wesleyan Training College, Westminster, London. He was English correspondent of the New York *Christian Advocate*, and for several years was on the staff and afterwards became sole editor of the *London Quarterly Review*. His works include: *Wesleyan Methodism and Congregationalism Contrasted* (1852); *Modern Anglican Theology* (1857, 1859, 1880); *The Churchmanship of John Wesley* (1868, 1878, 1886); *The Living Wesley* (1875, 1891); *Dr. Pusey, His Character and Life Work* (1883); and *Oxford High Anglicanism and Its Chief Leaders* (1895, 1899).

RIGGING (from *rig*, from Norweg., dialectic Swed. *rigga*, to rig; probably connected with AS. *wrēon*, ONorthumb. *wria*, archaic Eng. *wry*, to cover). The rigging of a vessel includes all the ropes and chains used to support or operate her masts, yards, booms, gaffs, sails, etc. It is of two kinds, standing rigging and running rigging. The former is semi-permanent and chiefly consists of supports to the masts such as shrouds, stays, backstays, etc. When once in position these are not moved except when they require slight adjustment or renewal. Yards, gaffs, and booms have some standing rigging for their support or for other purposes. Standing rigging is usually of wire or hemp rope; if the former it is commonly painted, or galvanized, or both; if of hemp, it is tarred. For further preservation standing rigging is parceled (wrapped with tarred or painted canvas) and served (wrapped closely with marline or spun yarn). The running rigging of a ship comprises the moving or movable ropes which are used to operate the yards, gaffs, booms, and sails, or to raise and lower the upper masts, hoist weights, and the like. Such ropes are chiefly of manila fibre, but some are of untarred hemp or cotton and others of flexible wire or chain. The most important ropes of the running rigging are the braces (used to swing the yards or keep them properly pointed), the halliards (used to hoist the yards or sails), and the gear attached to the sails (q.v.), such as sheets, clewlines, buntlines, etc. See SAIL; also SHIP.

RIGGS, ELIAS (1810-1901). An American missionary and linguist. He was born at New Providence, New Jersey, graduated at Amherst College in 1829, and at Andover Theological Seminary in 1832. The same year he was ordained a Presbyterian missionary and entered the service of the American Board. The first six years of his missionary career were spent in Athens and Argos. In 1838 he was transferred to Smyrna, and in 1853 to Constantinople, where he continued in the service of the American Board until his death. Between 1856 and 1858 he visited America and during this time superintended the publication of his Armenian Bible and taught in the Union Theological Seminary. He was a member of the committee appointed by the British and Foreign Bible Society and the American Bible Society to prepare the publication of the Turkish Bible in both Arabic and Armenian versions, which was accomplished in 1878; and again a member of the revising committee who prepared a version suitable to the needs of common readers, issued in 1886. He published *A Manual of the Chaldee Language, Containing a Grammar, Chrestomathy, and a Vocabulary*, (1832, and subsequent editions); *Grammatical Notes on the Bulgarian Language* (1844); *Grammar of the Modern Armenian Language, with a Vocabulary* (1847); *Grammar of the Turkish Language as Written in the Armenian Character* (1856); *Translation of the Scriptures into the*

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Modern Armenian Language, with the aid of native scholars (1853, and subsequently); *Translation of the Scriptures into the Bulgarian Language*, assisted by native scholars and the Rev. Albert L. Long (1871); *A Harmony of the Gospels*, in Bulgarian (1880); *A Bible Dictionary*, in Bulgarian (1884).

RIGGS, JAMES STEVENSON (1853—). An American Presbyterian theologian, born in New York City. He graduated at Princeton in 1874, and after two years at Leipzig and Tübingen entered Auburn Theological Seminary. There he graduated in 1880, and in 1884, after a pastorate at Fulton, N. Y., became adjunct professor of biblical Greek. In 1892 he was appointed to the chair of biblical criticism and New Testament. His publications include *The Bible in Art* (1895) and *A History of the Jewish People During the Maccabean and Roman Periods* (1900).

RIGGS, STEPHEN RETURN (1812-83). A missionary among the American Indians, born in Steubenville, Ohio. He was educated at the Ripley (Ohio) Latin School, Jefferson College, and the Western Theological Seminary at Allegheny, and in 1837 was commissioned missionary at Fort Snelling. During the early years of his work he found time to publish lesson books in Dakotah, and to prepare the manuscript for his *Grammar and Dictionary of the Dakotah Language*, which was published by the Smithsonian Institution (1852). In 1883 his Dakota-English Dictionary was published by the Bureau of Ethnology.

RIGHI, rē'gē. A mountain of Switzerland. See RIGI.

RIGHI, AUGUSTO (1850—). An Italian physicist. He was born in Bologna and was educated at the university of that town. After holding various positions in the Physical Institute, he was called to be professor of physics at the University of Palermo, and was then elected professor of physics in the University of Bologna, Italy. Professor Righi has devoted himself almost entirely to the field of electricity and magnetism. His researches in regard to the connection between the magnetization of bismuth and other substances and their conduction of heat and electricity are classical. Immediately after the discovery by Hertz of the physical methods for the investigation of electro-magnetic waves Righi took up this line of work and made many important advances. It was in the elaboration of certain methods due to Professor Righi and by simple changes in his apparatus that Marconi succeeded in making use commercially of electric waves in wireless telegraphy (q.v.).

RIGHT (AS. *riht*, Goth. *raihts*, OHG. *reht*, Ger. *recht*, right; connected with Lat. *rectus*, Av. *rašta*, right, straight, Skt. *ṛju*, right, and with Lat. *regere*, to direct, rule, Gk. *ὀρέγειν*, *oregein*, to stretch out), THE. In European politics, the name generally given to conservative parties in the national assembly. See POLITICAL PARTIES.

RIGHT OF WAY. See WAY.

RIGHTS, CIVIL. In the most general sense, rights secured to the individual by civil or municipal law. As thus employed the phrase is nearly identical with legal, as distinguished from moral or merely abstract rights. It does not in a given case necessarily comprehend all the privileges of citizenship, still less the privileges which political philosophers may claim as incident to citizenship. Thus the rights to life, to liberty, and to the pursuit of happiness, asserted in the American Declaration of Independence, are civil rights only in so far as they are defined and protected by the Constitution and laws of the United States. Further than that they are merely rhetorical and philosophical claims as to the rightful position of the individual in organized society.

The expression 'civil rights' thus includes the rights which people have and are legally capable of enforcing against one another, as well as those rights which individuals may assert and defend against the State. It is sometimes employed in a more limited sense, as referring only to the latter class of rights, such as are asserted in the Declaration of Rights made by the Lords and Commons of England at Westminster in 1688 and presented to William of Orange and Mary, his wife, as the conditions of their accession to the throne, the Bill of Rights passed by the British Parliament in 1689, such provisions of law as are embodied in the first ten amendments to the Federal Constitution of the United States, and corresponding or similar provisions in the constitutions of the several States. These provisions relate to the religious freedom of the citizen, to liberty of speech and of the press, to the right to assemble and petition for the redress of grievances, to the right to bear arms, to the protection of the individual against arbitrary arrest, to the guarantee of an orderly administration of justice, to the right of habeas corpus, and to security against arbitrary interference with property and the like.

In the United States the phrase 'civil rights' is employed in a specific sense to denote the rights intended to be secured by the fourteenth and fifteenth amendments to the Federal Constitution, adopted in 1868 and 1870 respectively, and by certain acts of Congress and of the Legislatures of the several States to the same effect. These constitutional provisions and legislations were a part of the reconstruction policy of the Government and were intended to secure the recently emancipated slaves in their freedom and in the exercise of the rights of citzenship which had been conferred upon them. The more important provisions of the two amendments referred to are (1) those forbidding the States to make or enforce any law which shall abridge the privileges or immunities of citizens of the United States, or to deprive any person of life, liberty, or property without due process of law, or to deny to any person the equal protection of the laws; (2) that providing for the reduction of the representation of a State in Congress in proportion to the number of its male citizens over twenty-one years of age who are denied the right of suffrage; and (3) that which declares that the right of the citizens of the United States to vote shall not be abridged by the United States or by any State, on account of race, color, or previous condition of servitude.

It is generally conceded that these provisions of the Constitution have failed of their object and that they have done little to secure to the negro in America the civil rights to which they refer. As to the second provision above enumerated, no effort has been made by the National Government to enforce it. The third provision has been generally evaded in the Southern States, and

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in some of them the negro has been effectually excluded from the suffrage by constitutional and statutory provisions prescribing strict educational or property qualifications for the exercise of the right to vote.

The first provision, which aims to secure to all citizens equality of rights and privileges, though not as completely futile as the others to which reference has been made, has had a very limited effect. Being by its terms restricted to the acts of States, it does not extend to the acts of individuals, even though they be State officials in the performance of their public duties. Thus a statute of West Virginia providing that juries should be composed of 'white male citizens' is in conflict with the constitutional provision, and therefore void; but the act of a county judge in habitually excluding negroes from the juries which he was authorized by law to select from the citizens of the county at large was not controlled by the provision in question. Then, too, the operation of the provision has been more restricted by judicial construction, as in the decision that a statute forbidding the intermarriage of whites and blacks was not within the condemnation of the Constitution, as the amendment in question was designed to secure rights of a civil and political nature only and not social or domestic rights. It has also been held that the amendment does not add to the privileges and immunities of citizens, but only protects those which they already have. Thus it does not extend the franchise nor the right to serve on juries to negroes or to women who do not already possess it.

These illustrations show that the civil rights legislation of the nation at large has been of little effect. The more immediate and complete jurisdiction of the several States over their citizens, however, renders legislation of this character when enacted by them much more efficacious. Several of the Northern States have accordingly passed effective civil rights laws of the general tenor of the constitutional provisions above considered, but aimed at individual rather than governmental interference with such rights. Thus in many of the States railroad and other transportation companies, hotels, theatres, school boards, etc., are forbidden to discriminate against persons because of their color or previous condition of servitude, and such laws have been found to be reasonably capable of enforcement. The strong sentiment of the decade immediately following the Civil War has to a considerable extent abated, however, and, though the negro is still far from the enjoyment of the civil rights of his white fellow-citizens, the demand for such legislation as that above described has, at the beginning of the twentieth century, well nigh died out. This is probably due in a measure to a growing conviction that such rights are rather to be won by the growth of intelligence, virtue, and industry, than gained by legislation.

RIGHTS, Declaration and Bill of. A statement of the fundamental rights of the English nation prepared by the convention which called the Prince and Princess of Orange to the throne of England after the Revolution of 1688, and which was imposed on William and Mary as a condition of their succession to the crown. This declaration, drawn up by a committee of the Commons, and assented to by the Lords, began by declaring that King James II. had committed certain acts contrary to the laws of the realm. The King, by whose authority these unlawful acts had been done, had abdicated the throne; and the Prince of Orange having invited the estates of the realm to meet and deliberate on the security of religion, law, and freedom, the Lords and Commons had resolved to declare and assert the ancient rights and liberties of England.

This declaration of rights was presented to the Prince and Princess of Orange at Whitehall, and accepted by them with the crown. Being originally a revolutionary instrument, drawn up in an irregular assembly, it was considered necessary that it should be turned into law. The declaration of rights was therefore brought forward in the Parliament, into which the convention had been turned, as a bill of rights, and passed the Commons; but an amendment proposed in the Lords regarding the settlement of the crown on the issue of the Princess Sophia, in the event of Mary, Anne, and William all dying without issue, led to several ineffectual conferences between the two Houses, which ended in the measure being dropped. The bill was, however, reintroduced in the following session of Parliament (1689) without the proposed amendment, when it passed both Houses, and obtained the royal assent—a clause, however, being added, which originated in the House of Lords, to the effect that the kings and queens of England should be obliged, on coming to the throne, in full Parliament or at the coronation, to repeat and subscribe the declaration against transubstantiation, and that a king or queen who should marry a Roman Catholic would be incapable of reigning in England, and his or her subjects would be absolved from their allegiance. The coronation provisions in the Declaration of Rights have been closely adhered to in England ever since the days of William, but recent enactments of Parliament (1901) have rendered it possible to make certain modifications in the coronation oath, whereby Roman Catholics may not be offended, especially in the declaration against transubstantiation. The text of this declaration may be found in Adams and Stephens, *Select Documents of English Constitutional History* (New York, 1901).

RIGHTS, Legal. In attempting to define a legal right, juristic writers lay more or less stress upon the following points: (1) A legal right is a power or complex of powers accorded by the law to a person, natural or ideal. The person to whom a right is accorded, in whom it is 'vested,' is sometimes termed the 'person of inherence.' (2) A legal right implies a general duty of all other persons not to interfere with its exercise. If a right entitles its holder to demand from a particular person a special forbearance or a special act, a special duty rests upon that person. The persons upon whom duties rest, or against whom rights run, are sometimes termed 'persons of incidence.' (3) From the correspondence of rights and duties it results that the law may create rights by implication, by imposing general or special duties. (4) Rights are limited powers. Unlimited powers belong only to the sovereign, the State. (5) Rights protect interests. The interests protected may be public or private or mixed.

It is not always admitted that every legal right implies a corresponding general duty of non-interference. It is often asserted that obli-

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gations which are rights *in personam* (q.v.), calling for acts of forbearance from particular persons, imply no duties resting upon other persons. Interference between obligors and obligees is, however, possible; and in some cases the law affords remedies. The question is of practical importance, because the theory that the rights of a creditor (e.g. those of an employer) have no protection against the acts of third persons tends to impede the development by the courts of adequate remedies for interference with such rights.

If all rights run against all members of the community, it is unnecessary and confusing to assert this especially of rights *in rem* (q.v.). Properly speaking, the substantive right *in rem* has no personal incidence until it is infringed. The infringement begets a remedial right which has personal incidence.

The right in its personal incidence was termed by the Romans *actio*, and is termed in English law 'right of action.' The German law uses the word 'claim' (*Anspruch*).

By substantive rights we mean those rights which constitute part of the normal legal order. Purely personal rights (life, liberty, physical integrity, reputation, etc.), family rights, rights *in rem*, and rights *in personam* which impose upon the person of incidence no duty except of forbearance—all these rights contemplate the maintenance of a certain state of affairs. As long as the contemplated state of affairs is maintained, these rights are satisfied. When it is disturbed, remedial rights come into existence. The prime remedial right, which every legal system recognizes, is that of defense against wrongful aggression. Early law gives further rights of self-help, but in every highly developed system these are greatly restricted. The private person whose right has been violated is regularly referred for redress to the courts; his remedial rights are rights of action in the narrower sense. If the invasion of the right is also a crime, the modern State exacts penalty of its own motion.

When substantive rights *in personam* impose upon the person of incidence a positive duty, e.g. to pay money or to do something, the right is unsatisfied until the duty is performed. In such a case a remedial right (right of action) exists side by side with the substantive right from the outset. This distinction is of importance in the law of prescription or limitation of actions (doctrine of *actio nata*). Some writers assert that in these cases there is no substantive right that is distinguishable or separable from the remedial right, but this is not the view held by the English courts.

Logically remedial rights are a consequence of substantive rights: 'where there is a right there is a remedy.' Historically substantive rights have been defined gradually by the development of remedies to meet particular wrongs.

The essential elements of rights related as means and ends are power and interest. These elements are separable. Power may be held by one person in the interest of another or of others. This is the aspect which family rights—rights of husbands, fathers, and guardians—assume in highly developed law. This is the position assigned in English law to executors and administrators. This is also at every legal system the position of the corporation. The legal power is held by the ideal or juristic person, the corporation. The interest may be that of the members, as in the ordinary private corporation; or it may be that of the public, or of a section of the public, as in the charitable corporation, in the State, and in all the subdivisions of the State. In all these cases of separation of power and interest, the 'legal right' is in the natural or ideal person who holds the power, and the 'equitable right' in the persons whose interests are represented—the beneficiaries.

Corporations, unless prohibited by statute, may hold legal rights when the corresponding interest is that of another corporation. This is the origin of the popular term 'trust,' now loosely applied to all extensive industrial and financial combinations. A State may hold power in the interest of other than its members. During the period intervening between the Spanish-American treaty of peace and the establishment of the Cuban Republic, the United States, as the Supreme Court affirmed, held the sovereignty of Cuba in trust.

When a private person, natural or juristic, holds a legal right which subserves not only the interest of the holder, but a public interest also (mixed interest), such private person or corporation is in reality a quasi trustee. The right held is said to be 'affected with a public use,' and its exercise is subjected to public control.

The distinction between private and public rights is based on the character of the interest subserved rather than on the legal position of the person who exercises the power. When a citizen is exercising his right of voting we do not term him a public officer, but he is exercising a public right. When the State or any public corporation holds property as a financial investment or enters into a contract, the rights accruing to the State should be treated as private rights. This is the theory of the civil law (State as fiscus), but not of the English law as regards the sovereign nor of the American law as regards the nation or the several States. In Anglo-American law, however, the correct theory is applied in the case of other public corporations; and in our law we are working toward the correct practice through the establishment of courts of claims. For literature, consult the works referred to under JURISPRUDENCE; see also JUSTICE; LAW; NATURAL LAW.

RIGHTS, NATURAL. See NATURAL LAW.

RIGHTS OF MAN. The term applied to a group of fundamental rights embodied in a famous declaration adopted by the French National Assembly on August 26, 1789. It was drawn up principally by Dumont in response to the suggestion contained in several of the *cahiers* that in order to prevent the recurrence of abuses a clear statement of the rights of the individual should be prepared and given the sanction of the estates. It declares that all men are born and remain equal in rights; that social distinctions can be founded only on the general good; that law is the expression of the general will and every citizen has a right to participate in its enactment either personally or through his representative; that public burdens should be borne by all members of the State in proportion to their ability; that the elective franchise should be extended to all; that no one should be accused, arrested, or imprisoned except according to due process of law; that no one should be disturbed on account of his religous opinions; that the free

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interchange of ideas is one of the most valuable rights of the citizen and hence every one may freely write, speak, or print without interference although subject to responsibility for abuse of the right; that all citizens have a right to decide personally or through their representatives as to the necessity of public contributions, to know how they are applied, etc. The declaration aroused general enthusiasm throughout France and appeared in modified form in the succeeding French constitutions down to 1848, and has served as a model for similar declarations in other Continental countries. Louis XVI. under the pressure of the events of October 5, after first refusing, was induced to support it. Much of the political philosophy embodied in the French declaration had appeared in the American Declaration of Independence and in the famous Virginia bill of rights of 1776. The principles embodied in the *Rights of Man* were attacked by Edmund Burke in his *Reflections on the French Revolution* and characterized as a declaration of anarchy. It was in reply to Burke's views that Thomas Paine (q.v.) wrote his *Rights of Man*, for which he was prosecuted in London for libel and found guilty. For the text of the French Declaration consult Robinson, *Readings in European History* (New York, 1903); consult, also, Abbott, *Rights of Man* (ib., 1902).

RIGHT WHALE. The Greenland whale (*Balæna mysticetus*), the foremost of the whalebone whales, so called because it was considered by the early whalemen of the North Atlantic the 'right' or 'proper' whale among the various species they encountered. See Plate of WHALES and Colored Plate of MAMMALIA.

RIGI, rē'gē, or **RIGHI.** An isolated mountain on the border of the cantons of Schwyz and Lucerne, Switzerland, between lakes Lucerne and Zug (Map: Switzerland, C 1). Altitude, 5905 feet. It commands extensive views of some of the finest Swiss scenery. Two rack-and-pinion railways lead up to the summit. The entire mountain is covered with pastures and woods. Consult Türler, *Der Rigi* (Lucerne, 1893).

RIGID BODY. See MECHANICS.

RI'GOR MOR'TIS (Lat., stiffness of death), or POST-MORTEM RIGIDITY. A peculiar evanescent stiffening of all the muscles of the body which occurs shortly after death. Both the voluntary and involuntary muscles are affected. The condition begins immediately after all indications of irritability to mechanical or electrical stimulation have ceased, but before putrefaction sets in. It affects the neck and lower jaw first, then the upper extremities, extending from above downward, and finally reaches the lower limbs. Rigor comes on more rapidly after muscular activity, is hastened by warmth and retarded by cold. When death is the result of acute diseases, and the muscles are well nourished, muscular irritability is prolonged, and rigor mortis sets in late, and persists for as much as two or three days. On the contrary, when death occurs from chronic or exhausting disease, rigidity commences early and passes off rapidly. Paralyzed muscles are not exempt from rigor mortis provided the paralysis has not been attended with excessive wasting of the muscular tissue. During the passage of a muscle into rigor mortis heat is developed, carbonic acid is liberated, and the reaction of the tissue becomes acid instead of alkaline. The cause of post-mortem rigidity is now believed to be chemical, namely, the coagulation and separation of the muscle plasma. See MUSCLE.

RIG-VEDA, rig' vā'dā. The oldest and most important of the four Vedas. See VEDA.

RIIS, rēs, JACOB AUGUST (1849—). An American journalist and author, born at Ribe, Denmark. He was educated in the Ribe Latin School and came to the United States in 1870. He had a varied experience as carpenter, coal-miner, farm laborer, cabinet-maker, traveling salesman, and newspaper reporter, became editor of the *South Brooklyn News* for a group of politicians, and afterwards bought and for a time managed the paper. In 1877 he began reportorial work for the New York *Tribune* and soon became police reporter for that paper. Subsequently he was for many years police reporter for the New York *Sun*. He became prominent in tenement-house and school reform in the congested regions of lower New York, and aided greatly in the movement which introduced parks in those sections. In 1896 and 1897 he was executive officer of the Good Government clubs, and in 1897 became secretary of the New York Small Parks Commission. The results of much of his study among the poorer classes were presented in his well-known volume, *How the Other Half Lives* (1890). Other works by him are: *Out of Mulberry Street*, a collection of fiction (1896); *A Ten Years' War* (1900); and the autobiography, *The Making of an American* (1901), first published serially in *The Outlook*.

RIKWA, rik'vā, or **RUKWA**, or LAKE LEOPOLD. A lake basin in German East Africa lying in a branch of the Rift Valley, 50 miles east of the southern end of Lake Tanganyika (Map: Africa, H 5). Length, about 100 miles; width, 30. High and steep mountains surround it. In the dry season, however, the greater part of the basin is a dry plain. It has no outlet, and its water is saline. The lake is rapidly drying up. It was discovered in 1880 by Thomson.

RI'LEY, CHARLES VALENTINE (1843-95). A distinguished entomologist, born in London, England. He studied at Dieppe and Bonn, and in 1860 came to the United States. In 1868 he was appointed State entomologist of Missouri and he began with B. D. Walsh the publication of *The American Entomologist*. In 1877 he was appointed a member of the entomological commission to investigate the locust plague in the West, and in 1878 he became United States entomologist, in which capacity he served until 1894, except during the years 1879 and 1880. In 1884 he became curator of insects in the United States National Museum, to which he presented his collections. His publications were very numerous. They include the nine *Annual Reports on the Insects of Missouri* (1868-77); *Potato Pests* (1876); *Locust Plague in the United States* (1877); and *Annual Reports of the Entomologist of the Department of Agriculture* (1878, 1881-94).

Riley was ranked as the foremost economic entomologist of his time. He organized the Division of Entomology of the United States Department of Agriculture and was identified with the great progress made by the United States in the discovery of remedies for injurious insects. His work on the grapevine phylloxera gained him many honors from the French Government.

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In the field of general biology he is known by his paper "On the Causes of Variation in Organic Forms," published in the *Proceedings of the American Association for the Advancement of Science* for 1888.

RILEY, JAMES WHITCOMB (1853—). A popular American poet and public reader, who first came into public notice as "Benj. F. Johnson, of Boone." Riley's father was a well-to-do lawyer of Greenfield, but the son, instead of following the law, worked first as a sign-painter, and afterwards joined a company of strolling actors, for whom he used to remodel songs and write plays. His fame rests in part on his brilliant gift of mimicry. In 1873 he got a position on the staff of the Indianapolis *Journal*, to which paper his first verses were contributed in 1875. Much of his verse is written in the so-called 'Hoosier' dialect, but many of his most beautiful compositions are in pure English. The dialect poems deal with scenes of simple life, and are liked for their humor, pathos, originality, and sincerity, and for the feeling for Indiana character which they contain. Riley is also a genuine poet of childhood. His first book of verse appeared in 1883, entitled, *The Old Swimmin'-Hole and 'Leven More Poems, by Benj. F. Johnson, of Boone*, and since then the volumes have been numerous. Among them are: *The Boss Girl, a Christmas Story, and Other Sketches* (1886), in prose; *Character Sketches and Poems* (1887); *Afterwhiles* (1888); *Old-Fashioned Roses* (1888); *Pipes o' Pan: at Zekesbury* (1889); *Rhymes of Childhood* (1890); *The Flying Islands of the Night* (1891); *Neighborly Poems* (1891); *An Old Sweetheart of Mine* (1891); *Green Fields and Running Brooks* (1893); *Poems Here at Home* (1893); *Armazindy* (1894); *A Child World* (1896); *The Rubaiyat of Doc. Sifers* (1899); *Home Folks* (1900); and the *Book of Joyous Children* (1902).

RIMBAUD, răn'bō', JEAN ARTHUR (1854-91). A French poet and adventurer, connected with the Symbolist movement in French literature. He was born at Charleville (Ardennes), and was sent to a good school. He began to write verses as a child, and ceased to write them at nineteen. In 1871 he went to Paris, and there the 'Parnassians,' above all Verlaine, welcomed the precocious author of the *Batteau Ivre*. His connection with the Commune forced him to leave France shortly after this date, and, accompanied by Verlaine, he went to England and Belgium, where he had a violent quarrel with his friend, an account of which he published in *Une saison en enfer* (1873). In 1880 he went to North Africa, where he became a trader with headquarters at Harrar and Shoa. By 1890 he had accumulated a fortune and was ready to return to France, and to resume writing, but a tumor had developed on his knee, and he died at a hospital in Marseilles after the amputation of the leg. His poems were published in Paris in 1886, by Verlaine, who thought the author of them dead, and they attracted much attention. The *Illuminations* contains his sonnet on the vowels, and the few other poems that make him one of the most original of French poets. His works were collected by his brother-in-law, Paterne Berrichon, who also gives a sketch of his life in *Vie de Jean-Arthur Rimbaud* (1898). Consult: Whibley, "A Vagabond Poet," in *Blackwoods* (Feb., 1899), and Symons, "Arthur Rimbaud," in the *Saturday Review* (May, 1898).

RIMBAULT, EDWARD FRANCIS (1816-76). An English musical writer and editor, born in London. His father was Stephen Francis Rimbault, an organist and composer, and from him he received part of his instruction. In addition to this, he was a pupil of Samuel Wesley and Dr. Crotch. In 1838 he began to give lectures on English musical history, and two years afterwards, with E. Taylor and W. Chappell, he founded the Musical Antiquarian Society. He was lecturer at the Liverpool Royal Institute, at the Collegiate Institute, and at the Edinburgh Philosophic Institute. He produced only a few works: the operas *The Fair Maid of Islington* (1838) and *The Castle Spectre* (1839), a cantata, *Country Life*, and a number of songs of which *Happy Land* is the favorite. In addition to these, he wrote: *Who Was Jack Wilson, the Singer of Shakespeare's Stage?* (1846); *Bibliotheca Madrigaliana* (1847); *The Early English Organ-Builders and Their Works* (1864); *and J. S. Bach* (1869).

RIMINI, rē'mē-nē (anciently *Ariminum*). A city in the Province of Forlì, Italy, situated on the Marecchia, near the Adriatic, 70 miles southeast of Bologna (Map: Italy, G 3). Rimini has regular streets, well-built houses, and many fine churches. The thirteenth-century Gothic cathedral was rebuilt in the Renaissance style of the fifteenth century. The interior is embellished with allegorical figures and frescoes. The city has a town hall with a picture gallery; an archæological museum; and a library of 33,000 volumes. There are a technical school and a school of navigation. Among the objects of interest are the well-preserved marble bridge of Augustus over the Marecchia, a triumphal arch, and the remains of an amphitheatre. The port of Rimini is crowded with vessels engaged in the fisheries, which employ nearly half the population. The other industries are silk-spinning, salt-refining, and the manufacture of glass, rope, and furniture. Population (commune), in 1881, 37,078; in 1901, 43,203. Rimini was founded by the Umbrians. It became an important city under the Romans, and was the terminus of two great roads leading from Rome. Here, in B.C. 49, Julius Cæsar began the war which made Rome an empire. In the thirteenth century Rimini passed under the rule of the powerful family of Malatesta (q.v.), who were dispossessed by Cesare Borgia in 1500; then for 25 years, beginning with 1503, it was subject to Venice. It was a Papal possession from 1528 to 1797, and from 1815 to 1860. The Council of Rimini, held in 359, condemned the teachings of Arius.

RIMINI, FRANCESCA DA. See FRANCESCA DA RIMINI.

RIM'MER, WILLIAM (1816-79). An American sculptor, born in Liverpool, England. He studied medicine, but became a sculptor and lecturer on art subjects. He delivered the first course of lectures on art before the Lowell Institute of Boston, and gave courses also at Harvard University and (1870) at the National Academy in New York City. In 1866-70 he was director of the School of Design of Cooper Institute, New York. His sculptures include a colossal granite

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head, "Saint Stephen," "Osiris," "The Falling Gladiator," and a statue of Alexander Hamilton (Boston). He published a volume on the *Elements of Design* (1864).

RIMMON. The name of a Syrian deity who had a temple in Damascus, according to II. Kings v. xviii. The word also occurs in proper names, although in such cases it is frequently difficult to decide between the name of the god and the word for pomegranate (Heb., *rimmōn*). Rimmon is now identified with the Babylono-Assyrian storm-god Ramman, who is also thought to be the same as the Syrian Hadad. See HADAD; RAMMAN.

RIM'SKY-KOR'SAKOFF, NICHOLAS ANDREYEVITCH (1844—). A Russian musician and composer, born at Tikhvin, in the Government of Novgorod. He became connected with the various important national musical organizations, and threw his influence toward the encouragement and development of a national Russian music. With Balakireff he was conductor of the Imperial Orchestra and the Russian Symphony concerts. His compositions, which are permeated with the Russian spirit, include operas, symphonies, church music, and arrangements of Russian folk-songs. He also wrote an important theoretical treatise on harmony.

RINALDO, rē-näl'dō (Fr. *Renaud, Regnault*). The bravest of the sons of Aymon (q.v.). He figures prominently in the *Orlando Furioso, Orlando Innamorato, Gerusalemme Liberata, Renaud de Montauban,* and other early romances, French and Italian.

RINALDO RINALDINI, rē'nal-dē'nē. A noted robber romance by Christian August Vulpius (1798), which was translated into many languages. It is the prototype of innumerable romances in the same field. A revised edition by Gildemeister appeared in 1890.

RINDFLEISCH, rint'flish, GEORG EDUARD VON (1836—). A German pathologist, born in Köthen and educated at Heidelberg and Würzburg. In 1856 he went to Berlin to work under Virchow, and in 1861 became Heidenhain's assistant in histology at the University of Breslau. After a short stay in Zurich he became professor at Bonn in 1865 and in 1874 at Würzburg, where a splendid pathological institute was built under his direction. He studied especially the diseases of the skin, and urged the scrofulous character of pulmonary tuberculosis. Rindfleisch's chief writings are *Lehrbuch der pathologischen Gewebelehre* (1866-69) and *Elemente der Pathologie* (1883), which were both translated into French.

RINE'HART, WILLIAM HENRY (1825-74). An American sculptor, born near Union Bridge, Carroll County, Md. He did his first work as a sculptor while a stone-cutter in a quarry on his father's farm. In 1855 he went to Florence, Italy, and in 1857 he returned to Baltimore, where he executed numerous busts and the two statuettes, an "Indian" and a "Backwoodsman," which act as supports for the clock in the House of Representatives. He returned to Italy in 1858, settling at Rome, where he died. In 1872 his marble statue of Chief Justice Taney was erected at Annapolis; there is a replica in Mount Vernon Square, Baltimore. He also completed the great bronze doors of the Capitol at Washington, which Crawford left unfinished at his death. His works may best be studied in the Corcoran Art Gallery, Washington, and in the Peabody Institute, Baltimore. The former possesses his "Atalanta," "Latona and Her Children," "Diana," "Apollo," "Endymion," and "Rebecca;" in the latter are the works left in the sculptor's studio at his death, and his "Clytie Forsaken by Apollo," which is considered his masterpiece.

At his death he bequeathed his property to two trustees, W. T. Walters and B. F. Newcomer, by whose skillful management it was augmented to $100,000. The administration of this fund was then given over to the Peabody Institute. Scholarships for the encouragement of young sculptors in Paris and Rome were established and in other ways the art of sculpture was promoted.

RING (AS. *hring*, OHG. *hring, ring*, Ger. *Ring*, ring; connected either with OChurch Slav. *krangŭ*, circle, or with Gk. *κρίκος, krikos*, ring, or Skt. *śṛṅkhala*, chain). In the arts, a solid bar returning into itself, or a more flexible body of similar general form, always of comparatively small cross-measurement. The finger-ring is the most important form. The form worn in ancient times was especially the signet-ring; and this was often worn with a string going through the stone and around the finger. To replace this string by a gold or silver or bronze wire was an obvious convenience. When once the signet-ring was established in popular favor it became so much a matter of course that bronze, or even cheaper material, was used, while the signet was often made of glass. It was also an obvious resource to engrave upon the metal chaton without inserting any stone whatever. Gold signet-rings of this entirely metallic sort are common both in the collections of antique and those of recent Oriental finger-rings. Several rings made entirely of glass have been found in the islands of the Mediterranean, and the central gem, the chaton, is often a glass cameo, either really cut with the drill and wheel, or a mere cast of an original.

The connection of the finger-ring with the marriage ceremony is not essentially a Christian custom, having been practiced by the Jews, and also among pagan peoples, like the Norsemen. The ring is blessed by the priest and placed upon the third finger, from which a vein is supposed to go directly to the heart.

The divided ring, so arranged that one person could wear it, and that it might also be divided into two complete rings, has been used for betrothals. Other finger-rings are made which consist of several hoops linked together so that they cannot be separated, but will drop into a chain, and are then capable of being brought together and worn, although it is a puzzle to fit them into place.

Many savage tribes, and semi-civilized peoples, as in India, load the limbs, fingers, and even the toes with rings. They are often mentioned in the Bible as being used by the Jews and other Oriental peoples, not only for sealing and purposes of ornament, but as talismans to avert evil and bring good. The Mohammedans to-day wear rings inclosing verses from the Koran. Egyptian rings were often engraved with an image of the scarab. In Greece every freeman wore a ring of gold, silver, or brass, except the Spartans, who wore rings of iron. The latter custom pre-

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vailed also in Rome under the Republic. Under the Empire to wear a gold ring was the special privilege of the senators, but afterwards it was extended to the knights, and under Justinian it was permitted to all freemen. The Romans practiced 'the most extravagant luxury with rings,' and engraved gems were especially common. Among Celtic and Germanic tribes rings were worn on fingers, wrists, and ankles, and especially as torques, a kind of elaborate collar about the neck. The knights of the Middle Ages wore iron rings about the neck, arms, and legs as a symbol of a vow, upon the fulfillment of which the ring was removed.

Many quaint customs in regard to rings survive from the Middle Ages and even from earlier periods. Cramp-rings, supposed to heal that ailment, were blessed by the King, in connection with the healing of the 'King's evil.' Poison-rings, like the one used by Hannibal in his suicide, contained a layer of poison, and the Italian *annulo del morto* was a refined means of assassination during the Middle Ages. The ring played an important part in the principal Venetian state ceremony, the yearly marriage of the republic with the Adriatic. From the *Bucentaur*, the Doge cast a ring into the sea, in token of its subjection to the republic. The celebrated *fisherman's ring*, used by the Pope, is engraved with the picture of Saint Peter in a boat, and the name of the reigning pontiff. With such a ring all the Papal briefs since the thirteenth century have been sealed. Upon the Pope's death his ring is broken and another is presented to his successor by the city of Rome. The ring plays an important part in the coronation of a king, and in the investiture of bishops. Before the invention of coinage rings were used as money, as is recorded of the Egyptians, Israelites, and the German and Celtic peoples of Europe, and to this day copper rings are used by African traders.

Consult: King, *Antique Gems and Rings* (London, 1872); Jones, *Finger-Ring Lore* (ib., 1876); Schneider, *Die Gestaltung des Ringes vom Mittelalter bis in die Neuzeit* (Mayence, 1878); Edwards, *History and Poetry of Finger-Rings* (New York, 1880).

RING, Max (1817-1901). A German novelist, born at Zauditz, near Ratibor, and educated at Breslau and Berlin. He practiced medicine until 1848, and, after two years at Breslau, settled in Berlin. In his novels, which are very numerous, he deals with modern social questions, and displays keen observation of human nature and ability to portray vividly scenes of want and misery. Chief among his works are: *Die Kinder Gottes* (1852); *Verirrt und Erlöst* (1855); *John Milton und seine Zeit* (1857); *Rosenkreuzer und Illuminaten* (1861); *Götter und Götzen* (2d ed. 1871); *Sieg der Liebe* (1886); and *Streber und Kämpfer* (1888).

RING AND THE BOOK, The. A poem by Robert Browning (1869). A book recording an old murder in Rome, bought by the poet, suggested the plan, while the ring is the circle of evidence about the theme. Pompilia, a young girl, is married to an elderly Count Guido Franceschini. Each is deceived as to the other's wealth, and Pompilia is cruelly treated. She finally escapes to join her adopted parents under the care of a priest, Caponsacchi. Guido pursues them and murders Pompilia and her parents. The story of the tragedy is told in ten versions by the actors, by the city, by certain officials, and by the Pope, making a poem of 20,000 lines. The finest parts are the monologues of Pompilia, the priest, and the Pope.

RING-BILLED GULL (so called from the colored ring about the beak). A small gull widely distributed throughout the interior of North America and along the coasts. The general color is light pearl-blue, the outer wing-quills black, the feet and bill greenish, and the bill encircled at the angle with a broad band of black. This gull breeds in colonies upon northern sea-beaches and on the shores of the lakes of the Northwestern States and Canada, and migrates southward in winter.

RINGBONE. A circle of bony matter around the horse's coronet, most common in the fore legs of draught horses with short upright pasterns, but occasionally also on the hind limbs of lighter-bred horses. Excessive work on hard roads is the most commonly attributed cause; proper rest and nourishment are the best preventives.

RING-DOVE. The largest and most common of European wild pigeons (*Columba palumbus*), which is characterized by a white spot on each side of its neck, forming a nearly continuous ring. See Pigeon.

RINGED PARROT. Any one of the small long-tailed Oriental parrakeets of the genus Palæornis, especially the ring-necked parrakeet (*Palæornis torquatus*), which ranges from India to Cochin-China, where it often does great damage to grain crops. Its general hue is green, and the neck of the male is ornamented with a rose-red collar, incomplete in front, above which is a black ring incomplete behind. See Parrakeet.

RING MONEY. At an early stage of society, prior to the invention of coinage, but after the inconveniences of direct barter had been discovered, the precious metals, formed into rings, were used as a medium of exchange. The use of ring money among the Egyptians is proved by representations in their wall paintings. The gold or silver rings were formed of a wire or bar of metal bent into a circle, but not quite united at the extremities, so that they could be made into a chain, from which portions could be detached at pleasure. It seems probable that the individual loops were not adjusted to a particular weight, but that each bundle of loops amounted in the aggregate to a particular weight. The ring money of the East found its way at an early period to Western Europe and the British Islands.

RING-NECKED SNAKE. A harmless American snake (*Diadophis punctatus*), about 15 inches long, blue-black above and orange-yellow below, with a yellow ring about the neck.

RING OF THE NIBELUNGEN. A tetralogy of music dramas, by Richard Wagner, comprising *Das Rheingold*, *Die Walküre*, *Siegfried*, and *Götterdämmerung*. The story is taken from the Nibelungenlied, but contains more of the Norse than German elements. The plot of Wagner concerns the magic nugget of gold in possession of the three Rhine maidens. He who shall forswear love and fashion the nugget into a ring shall gain supreme power in the world. In the *Rheingold*, Alberic, the Nibelung, seizes the gold, hav-

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ing renounced love, and he fabricates the mighty ring. He also causes the magic Tarnhelm (cap) to be made. Wotan, chief of the gods, has promised to give Fréia to the Giants for building his castle. They, however, accept in lieu the treasure which Alberic has amassed by means of the ring. The maddened Alberic curses the ring and its possessor. In the *Walküre*, Siegmund draws the fateful magic sword from the tree-trunk, and wins the love of Sieglinde. Brunhilda disobeys Wotan by trying to shield Siegmund in his mortal contest with the lawful Hunding and thus having favored Siegmund's union with Sieglinde, the mother of the future Siegfried. Brunhilda is condemned by Wotan to helpless sleep, encircled by fire. In *Siegfried*, the hero at length appears, having been reared by Mimi, the Nibelung. He forges a magic sword (Needful), and kills the dragon which guards the fateful ring after which Wotan had lusted and thus foredoomed the reign of the gods. Siegfried also kills Mimi, who had intended to betray him. A bird tells him of the sleeping Brunhilda surrounded by fire. He seeks the spot, plunges through the fire, finds the Valkyrie and wins her. In *Götterdämmerung*, Siegfried gives her the ring on his setting out for fresh exploits, but keeps his wonderful sword and the Tarnhelm. Through magic, he falls in love with Gutrune, and proposes to give Brunhilda to Gunther. Siegfried wrests the ring from Brunhilda. She perceives his faithlessness and consents to his murder by those jealous of him. Hagen kills him, and the despairing Valkyrie mounts the funeral pyre with the dead Siegfried. The Rhine daughters regain the ring and the Valhalla burns.

RING-OUZEL, or MOOR BLACKBIRD. A European thrush (*Merula torquata*), well known in the less frequented parts of Great Britain, where it does great harm to ripening fruit. It is blackish brown, each feather edged with gray, and is conspicuously marked with a white crescentic throat-patch, from which it receives its name. In its notes, manner of nesting, and behavior generally it is much like an American robin.

RING-PLOVER. A plover of the typical genus Ægialitis, the species of which are characterized among other peculiarities by the dark ring or gorget around their necks. The American ringed plover, or 'ringneck' (*Ægialitis semipalmata*) is dispersed in summer all over North America and breeds throughout Canada. Another species often called 'ring-plover' by the gunners is the piping plover (*Ægialitis meloda*). Consult Coues, *Birds of the Northwest* (Washington, 1874).

RING-SNAKE. The common snake of Great Britain (*Tropidonotus natrix*), so called because of the collar-like whitish markings behind the head. See WATER-SNAKE.

RINGSTRASSE, rĭng'sträs-se (Ger., Ring Street). A broad boulevard encircling what was the inner city of Vienna and containing a large number of magnificent public buildings. On or near it are situated the exchange, university, museums, houses of Parliament, the Court theatres, the town hall, the new Imperial palace, and several parks.

RING-TAILED IGUANA. An iguana (*Cyclura carinata*) of Jamaica, especially numerous in the hills near Kingston, which is about four feet in total length, and olive-green, with the tail marked with blackish bands. These iguanas feed mainly on grass, are timid, galloping to the trees on the least alarm, and are uneatable, on account of a most disagreeable odor.

RINGWALDT, rĭng'vält, BARTHOLOMÄUS (1530-99). A German didactic poet, born in Frankfort-on-the-Oder. In 1578 he became pastor of a Protestant congregation at Langenfeld. He wrote some church hymns, of which all caught the swing of the popular poetry of the time, and one beginning "Herr Jesu Christ, du höchstes Gut" is still well known. They were republished in 1858. But he is more at home in didactic poetry, in which he decries the evils of the day, even those within the Protestant body. *Die lautere Wahrheit* (1585) is an enchiridion. *Die christliche Warnung des treuen Eckarts* (1588) with its hero, who describes heaven and hell, gave Ringwaldt a rare opportunity for satire and the book was long popular. A third work, *Speculum Mundi* (1592), is cast in dramatic form and in greater degree portrays contemporary manners. Consult Hoffmann von Fallersleben, *Ringwaldt und Schmolck* (Breslau, 1833).

RINGWORM. A contagious parasitic skin disease due to the *trichophyton* fungus. It attacks the scalp, the body, and the beard, and according to its location is denominated *tinea tonsurans*, *tinea circinata*, and *tinea sycosis*. All three forms are exceedingly contagious and spread by contact, and by the use of hats, brushes, combs, towels, and razors in common. Ringworm of the scalp usually begins in the form of small circumscribed patches, the skin of which is more or less raised, pink, swollen, and covered with branny scales. As the disease progresses the patches become the seat of vesicles and pustules. The hair follicles are affected, and the hairs are seen to be broken off short, twisted and bent, and if placed under the microscope may be observed to be quite opaque, and converted into a mass of fungus spores. As a result of the loss of hair, baldness, more or less complete, but temporary, exists over areas sometimes as large as a silver dollar. Itching is a constant symptom. Sometimes inflammation is severe, with the formation of a boggy swelling, which exudes pus at many points. This condition is known as *kerion* and is apt to result in permanent baldness of the part affected.

Ringworm of the body occasionally co-exists with *tinea tonsurans*, but often occurs alone. The disease begins as a small reddish, scaly spot of papules, at first irregular in shape, but soon assuming a circular form. As the area increases in size the papules change to vesicles. The spot heals in the centre as it spreads at the periphery. This variety of ringworm affects the face, neck, and arms most frequently. *Tinea sycosis*, or ringworm of the beard, is sometimes called 'barber's itch.' See ITCH.

The essential point in the treatment of the varieties of ringworm affecting the hairy portions of the body is to apply to the roots of the hair one of the various parasiticides, but before this can be done the hair must be removed. This is done by shaving the affected areas and pulling out the loosened and diseased stumps with a pair of forceps. Crusts and scales must be loosened with hot water or oily applications. Among the parasiticides which act most effectively are sul-

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phur ointment, mercurial ointments, and iodine, carbolic acid, and caustic potash alone or in various combinations. During the treatment of ringworm, especially that affecting the head, great care should be taken to prevent its spread to other children.

RINK, HINRICH JOHANNES (1819-93). A Danish explorer, born at Copenhagen. He studied natural science, acted as mineralogist to the *Galatea* expedition around the world in 1845-47, and from 1848 to 1851 explored Northern Greenland. There he found his life work. From 1857 to 1871 he was inspector of Southern Greenland; then for ten years he was director of the island's trade at Copenhagen; and in 1882 he removed to Christiania. He wrote: *Die Nickobarischen Inseln* (1847); *Grönland, geographisk og statistisk beskrevet* (1852-57; Eng. trans., 1877); *Eskimoiske Eventyr og Sagn* (1866-71, English, 1875); *The Eskimo Tribes, Their Distribution and Characteristics* (1887-91); and *Grönländere og Danske i Grönland* (1888).

RIO AGUSAN, rē'ō ä-gōō'sän. A river of Mindanao, Philippine Islands (Map: Philippine Islands, K 11). It rises in the southeastern corner of the island and flows northward along the western base of the eastern coast range, passing in its middle course through several lakes and emptying into the Bay of Butûan through a large delta. It is the third largest river of the archipelago, the distance in a straight line from its source to its mouth being 125 miles. Its valley is very fertile and populous, the largest of the many towns on its banks being Butûan.

RIOBAMBA, rē'ō-bäm'bä, or BOLÍVAR. The capital of the Province of Chimborazo, Ecuador, situated on the road from Quito to Guayaquil, 95 miles south of the former and almost at the foot of the volcano of Chimborazo, 9100 feet above sea level (Map: Ecuador, B 4). It is one of the most ancient and historic towns of Ecuador, and contains the ruins of an Inca palace. Completely destroyed by an earthquake in 1797, it is now well laid out, and has a handsome new cathedral. Population, 12,000.

RIO BRANCO, brän'kō. The largest tributary of the Rio Negro (q.v.).

RIO CUARTO, kwär'tō. A town of Argentina, in the Province of Córdoba, situated on the Trans-Andean Railroad 200 miles west of Rosario (Map: Argentina, E 10). It is surrounded by orchards and is the principal market for large grazing districts. Population, in 1895, 13,812.

RIO DE JANEIRO, *Port. pron.* rē'o dâ zhä-nā'ê-ro. An important State of Brazil, situated on the southeastern coast and bounded by the State of Espirito Santo on the northeast, Minas Geraes on the northwest, São Paulo on the southwest, and the Atlantic on the southeast (Map: Brazil, J 8). Area, excluding the Federal District, 26,630 square miles. The climate is moderate and healthful in the elevated portions, but hot and unhealthful in the lowlands along the coast. Rio de Janeiro is well wooded, and forest products both in the shape of timber and drugs figure prominently among the exports. The chief agricultural product is coffee. About 70 per cent. of the coffee goes to the United States. Sugar is cultivated along the coast. Industrially Rio de Janeiro is one of the most advanced of the Brazilian States. It has a large number of cotton and woolen mills and sugar refineries, and a greater railway mileage in proportion to its area than any other State of Brazil. In 1896 it had more than 1200 miles. Population, 876,884 in 1890, and estimated at 1,227,575 in 1900. Rio de Janeiro is with the exception of the Federal District the most densely populated of the Brazilian States, having a density of about 50 per square mile. Most of the inhabitants are of mixed origin. The capital is Petropolis (q.v.).

RIO DE JANEIRO. The capital and largest city of Brazil, situated on the west side of the entrance to the Bay of Rio de Janeiro; latitude 22° 54′ S., longitude 43° 10′ W. (Map: Brazil, J 8). The location is exceedingly picturesque. The landlocked bay, which runs inland for 17 miles, is surrounded on all sides by forest-covered mountains whose spurs penetrate into the heart of the city. The narrow entrance and the islands lying inside of it are fortified. The city itself stretches for 15 miles along the shore, and from its nucleus at the inner end of the entrance it spreads out in long arms reaching far into the valleys and up the hillsides. This nucleus is the old city, and forms the business quarter. It is laid out in square blocks with long, narrow streets. The largest square in this section is the Praça da Acclamação, with a beautiful garden. Another park, the Praça 15 de Novembro, is surrounded by some of the finest public buildings in Brazil, such as the mint, the Senate house, and the city hall. In this neighborhood also is the former Imperial Palace, now occupied by the National Museum. The most conspicuous church is the Candelaria, with two large towers and a cupola. The principal educational institutions are the great national library with 247,000 volumes and many manuscripts, the National Museum, the botanical garden, the Historical and Geographical Institute, and the observatory. There are also a medical school, a polytechnic institute, a conservatory of music, and various commercial, industrial, scientific, literary, and art academies.

Public charities are well provided for. There are institutes for the blind and the deaf mutes, a large insane asylum, and several well-equipped hospitals, that of Santa Casa da Misericordia being one of the largest in the world. The public works, however, are somewhat inferior. There are an extensive system of electric street railways and a good water supply brought by aqueducts from the mountains. The drainage system, however, is not serviceable. This fact, together with the hot and humid climate, renders the city still an unhealthful place. Though yellow fever has decreased, there were still nearly 1000 cases of it in 1899.

Rio de Janeiro derives its chief importance from its commerce. The manufactures are relatively unimportant, and are represented chiefly by textile and flour mills. The harbor is absolutely safe, and is provided with extensive dock facilities. The shipping and trade have, however, decreased not a little during the past decade. In 1896, 1535 vessels of 2,469,628 tons entered; in 1900 only 843 vessels of 1,522,754 tons entered. The total value of imports in 1896 was $61,386,000, and in 1900 $45,985,320. The chief imports are cereals, coal, textiles, and machinery. The exports in 1900 amounted to $42,805,000.

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The leading export is coffee, of which 4,066,734 bags of 132 pounds each were exported in 1897, and 2,658,990 in 1900. The population of the Federal District (formerly called the Municipio Neutro), which includes the city and its suburbs, was, in 1890, 674,972, and in 1900, 779,000.

The first settlement at Rio de Janeiro was made by the French, who built a fort on one of the islands of the harbor in 1555, but were driven out by the Portuguese in 1557. The city itself was founded in 1567. In 1640 it was captured by the Dutch, who held it for a short time. In the middle of the eighteenth century it succeeded Bahia as the capital of Brazil. From 1808 to 1821 it was the residence of the Court of Portugal. Consult: Allain, *Rio de Janeiro, quelques données sur la capitale* (Paris, 1885); *Rio Janeiro, Archivo do districto federal* (Rio de Janeiro, 1894-97).

RIO DE LA PLATA, dâ lâ plä'tâ. See PLATA, RIO DE LA.

RIO DE ORO, ō'rō. A Spanish possession on the west coast of the Sahara Desert, extending from Cape Bojador to Cape Blanco, 400 miles, and bounded on the north by Morocco, and on the south by French Sahara (Map: Africa, C 2). The Spanish territory extends about 250 miles inland, the eastern boundary being fixed by a Franco-Spanish convention in 1901. It is an arid, rocky and sandy plateau, about 1000 feet high, and covered with a scant growth of esparto grass near the sea, though there are a number of oases in the interior. The climate is very dry and hot, the temperature sometimes reaching 120°. The inhabitants are mixed tribes of Mohammedan Berbers and negroes, obtaining a scanty subsistence by raising cattle, sheep, and camels. The only Spanish settlement is at Rio de Oro, on a low peninsula near the centre of the west coast. The Governor here is under the Governor of the Canary Islands. Vessels from the latter exploit the fishing grounds along the coasts. Population, estimated (1903), 100,000.

RIO GRANDE, grän'dâ. One of the head-streams of the Paraná River (q.v.).

RIO GRANDE, or RIO GRANDE DEL NORTE. A river of the Southwestern United States. It rises in the Rocky Mountains in southwestern Colorado, and flows first south through New Mexico, then southeast on the boundary between Mexico and Texas, and empties into the Gulf of Mexico, after a course of 1800 miles (Map: Texas, D 5). Its upper course passes through rocky gorges in which it forms rapids and cataracts, and lower down it becomes a shallow stream frequently obstructed by sand-bars. The greater part of it lies in an arid region, and in New Mexico its waters are largely drawn off for irrigation, so that during the dry season the river dries up for a considerable distance above and below El Paso. In its lower course it is subject to serious floods. It becomes navigable for small boats about 450 miles from its mouth. Near the latter lies the town of Brownsville, and opposite to it the Mexican town of Matamoras. Consult Stevens, *The Valley of the Rio Grande* (New York, 1864).

RIO GRANDE DE CAGAYÁN, dâ kä'gâ-yän'. The largest river of Luzon, Philippine Islands. It rises on the Caraballo Sur in Central Luzon and flows northward 200 miles through a magnificent valley, which is becoming an important tobacco-producing region (Map: Philippine Islands, F 2). It empties through the north coast into the Pacific Ocean. It is navigable for light-draught steamers.

RIO GRANDE DE MINDANAO, mēn'dâ-nä'ō. The largest river of the Philippine Archipelago. See PULANGUI.

RIO GRANDE DO BELMONTE, dô bĕl-mōn'tâ. A river in Brazil. See JEQUITINHONHA.

RIO GRANDE DO NORTE, nôr'tâ. A northeastern State of Brazil, bounded by the Atlantic Ocean on the north and east, the State of Parahyba on the south, and Ceará on the west (Map: Brazil, K 5). Area, 22,190 square miles. The interior is elevated and sparsely watered; the coasts are low and slightly indented. The chief river is the Piranhas. The climate is hot, but not unhealthful. Rio Grande do Norte is one of the poorest States of Brazil in regard to natural resources. Cotton, coffee, and sugar are raised to a limited extent and cattle-raising is also engaged in. The population in 1890 was 268,273. The capital is Natal (q.v.).

RIO GRANDE DO SUL, sōōl. The southernmost State of Brazil, bounded by the State of Santa Catharina on the north, the Atlantic Ocean on the east, Uruguay on the south, and Argentina on the west (Map: Argentina, G 9). Area, 91,250 square miles. The chief rivers are the Jacuhy, which falls into the Lagôa dos Patos, and the Ibicuhy, a tributary of the Uruguay. The climate is temperate and healthful. The mean temperature varies from about 63° to 66°; frosts and snow are not infrequent in the more elevated parts, while fever is almost unknown. The chief occupation is cattle-raising. Mining of zinc, amethysts, and agates is also carried on to some extent. The chief product and export of the State is dried meat. There are a number of cotton, woolen, and linen mills, soap factories, and other manufacturing establishments. The commerce is quite extensive and the annual exports amount to over $33,000,000. The commercial centre is the State capital, Porto Alegre. The State is well provided with transportation facilities. The population in 1890 was 897,455 and in 1900 it was estimated at 968,231. Rio Grande do Sul was colonized mostly by Germans. The foreign population amounts to about 50 per cent. of the total.

RIO GRANDE DO SUL. The chief port and former capital of the State of Rio Grande do Sul, Brazil, situated at the outlet of the Lagôa dos Patos into the Atlantic Ocean (Map: Argentina, G 10). The town lies in a barren, sandy plain, but has a safe harbor suitable for vessels of 15 feet draught. The entrance, however, is obstructed by sand bars. The city is connected by rail with Pelotas, and by steamers with Porto Alegre at the northern end of the lake. It exports beef and other cattle products, manioc, and Paraguay tea. Population, 19,000.

RIOJA, rē-ō'hâ, LA. A northwestern province of Argentina, bounded on the north by the Province of Catamarca, on the east by Córdoba, on the south by San Luis, and on the west by San Juan and Chile (Map: Argentina, D 9). Area, 34,546 square miles. The climate is very dry, and irrigation is generally necessary. Wheat, corn, lucerne, and wine are the chief agricultural products, and some stock-raising is carried on. La

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Rioja contains copper, sulphur, silver, gypsum, salt, graphite, and coal, the mineral most exploited being copper. The population in 1895 was 69,502. The capital is La Rioja, situated at the foot of Mount Belasco, and connected by rail with Catamarca and the southeastern provinces. It contains a college and a normal school, and had a population in 1895 of 6627.

RIOJA, FRANCISCO DE (c.1584-1659). A Spanish poet, born in Seville. He distinguished himself as a classical scholar at the university of his native town, and afterwards took orders and became canon in the Seville Cathedral. The Count of Olivarez, a friend of Rioja, called him to Madrid about 1614, and he remained at the Court some time. After the death of Philip III. he returned again and was made royal librarian and chronicler by Olivarez, whom he afterwards followed into exile (1643). His last years were spent in Seville and Madrid, where he was a member of the Inquisition. The best edition of his works is that of Barrera, who published the *Poesías* (1867), and *Adiciones á las poesías de D. Francisco de Rioja* (1872).

RIOM, rē-ôN'. The capital of an arrondissement in the Department of Puy-de-Dôme, France, picturesquely situated on a hill, 9 miles north of Clermont-Ferrand (Map: France, K 6). It is built of dark lava, and its domestic architecture of the fifteenth and sixteenth centuries and of the Renaissance period, and its churches, Saint Amable dating from the eleventh century, Notre-Dame-du-Marthuret from the fifteenth century, and the fourteenth-century Sainte-Chapelle, are of especial interest. Linen, leather, and brandy are manufactured. Riom was the capital of Auvergne during the fourteenth century. Population, in 1901, 11,061.

RION. A river of Caucasus, Russia, rising in the Government of Kutais. It flows in a western direction, passes Kutais, and enters the Black Sea at Poti. Total length, about 200 miles. It is navigable for 50 miles. The Rion is the ancient Phasis.

RIO NEGRO, rē'ō nā'grō (Sp., black river). The largest north tributary of the Amazon. Its upper course is generally considered to be the Guainia, which rises in the southeastern part of Colombia and flows east to the Venezuelan boundary, then southeast into Brazil (Map: Brazil, E 4). Here it is joined by the Uapés, which rises on the eastern Cordillera of the Andes in the central part of Colombia, and flows in an east-southeast direction until it joins the Amazon through a great inland estuary 50 miles above the mouth of the Madeira. The largest tributary is the Rio Blanco or White River, which rises on the border of Guiana and flows south to the main stream. In Venezuela the Guainia receives the Cassiquiare, an arm sent out by the Orinoco. The total length of the Rio Negro with the Uapés is about 1400 miles. The whole river system flows through a vast forest region which is but little explored. The upper courses are navigable for long distances. At its mouth in the Amazon it is 1½ miles wide, and 100 feet deep at low water, so that ocean steamers can at all times go directly to Manáos, the great outlet for the rubber collected along the banks. Consult Wallace, *Travels on the Amazon and Rio Negro* (London, 1889).

RIO NEGRO. A river of Argentina, forming the conventional northern boundary of Patagonia (Map: Argentina, E 12). It is formed by two headstreams, the Limay and the Neuquen, both of which rise on the eastern slope of the Andes. It flows southeast into the Atlantic Ocean, and its length up to Lake Nahuel-Huapi (q.v.) is about 600 miles, through nearly the whole of which distance it is navigable, though there are dangerous reefs in several places. On its lower course there are several settlements, chief of which is Viedma.

RIO NEGRO. A territory of Argentina, in Patagonia, bounded by the Territory of Pampa on the north, Chile and the Territory of Neuquen on the west, the Territory of Chubut on the south, and the Province of Buenos Ayres and the Atlantic Ocean on the east (Map: Argentina, D 12). Its area is estimated at 75,924 square miles. The southwestern portion belongs to the region of the Andes, while the remainder is occupied by a plateau. The chief rivers are the Rio Negro and its tributary the Limay, and there are also a number of lakes. A very small portion of the territory is cultivated; the raising of sheep, cattle, and horses is the leading industry. Population, in 1895, 9241. Chief town, Viedma.

RIORDAN, rī'ōr-dan *or* rēr'dan, PATRICK WILLIAM (1841—). A prelate of the Roman Catholic Church. He was born at Chatham, New Brunswick. He studied at Notre Dame, Ind., and at Paris and Louvain, Belgium, in which latter country he was ordained priest in 1865. Returning to America, he became one of the faculty of the Theological Seminary of Saint Mary's of the Lake, Chicago, as professor of ecclesiastical history and canon law. Somewhat later he gave instruction in dogmatic theology. He was pastor at Woodstock, Ill., in 1868, and the same year removed to Joliet, Ill., where he remained until 1871, when he assumed the rectorship of Saint James's Church, Chicago. In 1883 he was appointed titular Bishop of Cabasa and coadjutor with the right of succession to the See of San Francisco. The following year the Archbishop, Joseph S. Alemany, resigned, and Monsignor Riordan became Archbishop.

RIOT (OF. *riot, ryot, riote, riotte,* Fr. *riotte,* It. *riotta,* riot; of unknown etymology). A form of criminal offense against the public peace, consisting in the assembly of three or more persons with intent mutually to assist each other against any one who shall oppose them in the execution of some enterprise of a private nature, and afterwards actually executing the same in a violent and turbulent manner to the terror of the people, whether the act intended were itself lawful or unlawful. (Hawkins, *Pleas of the Crown,* ch. 65.) At common law the offense, unless it resulted in some more serious crime, was a misdemeanor; but in case the riot caused loss of life or serious bodily injury, the rioter might be punished for the felony committed.

If the riotous enterprise is of a public nature, in that it is directed toward the Government with the purpose of overthrowing or destroying it, the offense is treason (q.v.). The assembly need not be planned by the rioters in advance. It is enough to constitute the crime if there is the actual assembly resulting in the tumultuous execution of the private enterprise. The crime may be committed also if the rioters do not specifically

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intend to terrify others, if such is the natural or necessary consequence of their riotous acts.

When there is an assembly of three or more persons for some riotous purpose under such circumstances as to give rise to a reasonable apprehension on the part of others of a breach of the peace, although no actual public disturbance does result, the offense is known as unlawful assembly. If some steps are taken toward the execution of the unlawful or riotous purpose which, however, fall short of actual public disturbance, the offense is known as a rout. Thus if these persons assemble for the purpose of assaulting another in the public street of a city, they are guilty of unlawful assembly. While on their way to the place of attack or making other active preparations for the attack they are guilty of rout, and upon the execution of their purpose by committing the public assault they are guilty of riot.

The definition of the crime and its punishment are now generally regulated by statute.

RIOT ACT. An English statute, 1 Geo. I., st. 2, c. 5 (1715), which provided that if twelve persons or more were unlawfully assembled and disturbing the peace, any sheriff, under-sheriff, justice of the peace, or mayor, might by proclamation command them to disperse, and that if they refused to obey and remained together for the space of one hour after such proclamation, all participating in the assembly were guilty of felony. The statute has not been generally re-enacted in the United States, where the usual provision of the criminal law and police regulations have been found an adequate protection against rioters.

RIPARIAN RIGHTS. The legal rights of owners of land containing a watercourse or bounded by one, to its banks, bed, and waters. By the common law, in the absence of express limitations to the contrary, an owner of land immediately adjacent to a non-navigable stream owns the bed of the stream *usque ad filum*, that is, to the middle thread or centre of the stream. A riparian owner has the right to make a reasonable use of the waters of a stream adjoining his property. This right is liberally construed, but will not extend to using all the water, even though he consume it all without waste. He cannot divert the stream, or so pollute its waters as to interfere with the rights of those below him on the stream. The most effective remedy of a riparian owner where another makes an unreasonable or unlawful use of the waters of the stream is by injunction, and this gives ample opportunity for a court of equity to consider all the circumstances. See such titles as RIVERS; FILUM AQUÆ; ACCRETION; ALLUVION; WATER RIGHTS, etc.

RIP'LEY. A town in Derbyshire, England, 10 miles northeast of Derby (Map: England, E 3). It has manufactures of silk and lace, and mines of coal. Population, in 1901, 10,100.

RIPLEY, ELEAZER WHEELOCK (1782-1839). An American soldier, prominent in the War of 1812. He was born in Hanover, N. H., graduated at Dartmouth in 1800, studied and practiced law, removed to Portland, Me., was one of the representatives of the District of Maine in the General Court of Massachusetts in 1810-11, serving as Speaker in the latter year, and in 1812 was elected to the State Senate. On the outbreak of the War of 1812 he entered the United States Army as a lieutenant, and by successive promotions became a colonel in March, 1813, a brigadier-general in April, 1814, and soon afterwards, by brevet, a major-general. He was wounded in the attack on York (now Toronto), Can.; led the Second Brigade of General Jacob Brown's army in the battles of Chippewa and Lundy's Lane; and after the latter battle, both Brown and Scott being wounded, he exercised the chief command. He occupied and fortified Fort Erie, distinguished himself in the defense of that fort on August 15, 1814, and on September 17th was severely wounded while leading a sortie. (See FORT ERIE.) He resigned from the army in 1820, removed to New Orleans, La., practiced law there, was elected to the Louisiana Legislature, and from 1835 until his death was a member of Congress.

RIPLEY, GEORGE (1802-80). An American scholar and critic, born in Greenfield, Mass. He graduated at Harvard in 1823, was an instructor there, studied theology, and was ordained in 1826. He remained in Boston until 1841, busying himself with philosophical speculations, was gradually drawn into the Transcendental circle, wrote on metaphysics and education, and endeavored to further the knowledge of Continental literatures by a series of translations. On leaving his pulpit, he became a prime mover in the socialistic experiment of Brook Farm (q.v.). When this association failed (1847) Ripley went to Flatbush, L. I., and in 1848 he settled in New York City. He was the joint editor with C. A. Dana (q.v.) of *Appleton's New American Cyclopædia* (1857-63), and of the new edition of that work (1873-76). He also worked on the staff of *The Tribune*, chiefly as literary critic, and brought its reviews up to a high standard. His first wife died in 1861, and in 1865 he married a German of Parisian education, after which he traveled much, and became the centre of a brilliant literary circle, exerting thus the most genial and helpful influence of his life, greater in what he inspired others to do than in what he himself accomplished. The translations of *Foreign Standard Literature* (14 vols., 1838-42) were his most important publications and in their time had great influence. Consult: Frothingham, *George Ripley*, in the "American Men of Letters" (Boston, 1882); Swift, *Brook Farm* (New York, 1900), which has a bibliography; and see TRANSCENDENTALISM.

RIPLEY, HENRY JONES (1798-1875). An American Baptist divine and biblical scholar. He was born at Boston, Mass., and educated at the Boston Latin School and Harvard College. After finishing his theological course at Andover in 1819 he became an evangelist among the Southern slaves. One year excepted, he continued these labors until 1826, when he entered the faculty of the Newton Theological Seminary, as professor of biblical literature and pastoral duties. From 1860 to 1865 he was engaged in private literary work at Newton and gave instruction to freedmen preachers at Savannah, Ga. In 1866 he returned to Newton Seminary as librarian, and from 1872 to 1875 served as associate professor of biblical literature. His writings include: *A Memoir of Rev. Thomas S. Winn* (1824); *Christian Baptism* (1833); *Sacred Rhetoric* (1849); *Exclusiveness of the Baptists* (1857); *Church Polity* (1867).

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RIPLEY, James Wolfe (1794-1870). An American soldier, born in Windham County, Connecticut. He graduated at West Point in 1814, was commissioned second lieutenant of artillery, and was assigned to duty on the northern frontier, where he took part in the defense of Sackett's Harbor. In 1817-18 he served under Jackson during the Seminole War and the invasion of Florida, and in 1832-33 commanded the Government forces in Charleston Harbor, at the time of the Nullification movement in South Carolina. In 1832 he was promoted to be captain and in 1838 to be major of ordnance. In 1848 he was raised to the rank of brevet lieutenant-colonel. In 1854 he was transferred to the Watertown Arsenal, and in 1861, after being assigned to various other duties, he was commissioned brigadier-general and appointed chief of ordnance of the United States Army. As the Federal forces had then no heavy rifled cannon, he immediately ordered the conversion of old smoothbores and the manufacture of Parrott guns. In 1863 he was retired from active service, and was appointed inspector of fortifications on the New England coast, a position which he continued to fill until within a year of his death. At the close of the Civil War in 1865 he was brevetted major-general in the Regular Army 'for long and faithful services.'

RIPLEY, William Zebina (1867—). An American economist and sociologist, born at Medford, Mass. He studied civil engineering at the Massachusetts Institute of Technology, but then devoted himself to economics, studying that branch for two years at Columbia, where in 1893 he became lecturer in sociology. In 1895 he was named professor of economics and of sociology in the Massachusetts Institute of Technology. His publications include *A Financial History of Virginia, 1609-1776* (1893) and the Lowell Lectures, *Races of Europe* (1900). He was vice-president of the American Economic Association in 1898 and in 1900-01, and in the last year was made special agent on transportation to the United States Industrial Commission.

RIPON, rĭp'on. An episcopal city in the West Riding of Yorkshire, England, 22 miles northwest of York (Map: England, E 2). The market-place is spacious, and has in its centre an obelisk 90 feet high. The cathedral, the oldest part of which dates from the twelfth century, is cruciform, measures 270 by 87 feet, and is surmounted by two uniform towers, and also by a central tower. The Saxon crypt dates from the seventh century. Trinity Church is a fine cruciform edifice in early English. The principal industries are machine-making, tanning, malting, and brass and iron founding. There are also several flour-mills and varnish factories. Ripon was formerly noted for its woolen manufactures, and for the 'true steel of Ripon rowels' or spurs. The place received the name of Inhrypum from a monastery established in 660; in 678 it was created a see. It suffered from the Danes, Normans, and Scots, and during the Civil War was occupied by the Parliamentarians, but was retaken by the Royalists in 1643. Population, in 1901, 8225.

RIPON. A city in Fond du Lac County, Wisconsin, 22 miles west by north of Fond du Lac, on the Chicago and Northwestern and the Chicago, Milwaukee and Saint Paul railroads. It is the seat of Ripon College, opened in 1853, and has a public library. The centre of a productive region, Ripon has flouring mills, grain elevators, creameries, a wood-working factory, wagon and buggy works, knitting mills, pickling works, and glove and mitten manufactories. Ripon was settled in 1844 and incorporated in 1858. Population, in 1900, 3818. Consult Mapes, *History of the City of Ripon* (Milwaukee, 1873).

RIPON, Frederick John Robinson, Earl of (1782-1859). An English statesman. He was born in London, the son of Baron Grantham, and was educated at Harrow and at Saint John's College, Cambridge. He became private secretary to the Lord Lieutenant of Ireland, Lord Hardwicke, and in 1806 was elected to the House of Commons. He became a Lord of Admiralty in 1810, and Privy Councilor in 1812. In the latter year he became vice-president of the Board of Trade. In 1823 he was made Chancellor of the Exchequer and in that office carried through many important financial reforms. In 1827 he was promoted to the House of Lords with the title of Viscount Goderich, and in the same year, after having been for a short time Secretary of State for the Colonies, he was called to form a Cabinet. His administration was feeble, and in June of 1828 he retired. He served in Lord Grey's Cabinet (1830-34) as Secretary of State for the Colonies, and was an advocate of the second Reform Bill. He became Lord Privy Seal in 1833 and was created Earl of Ripon. In 1834 he hastened the fall of the Cabinet by his resignation, and he continually attacked the financial policy of the Melbourne Cabinet. In 1841 he was made president of the Board of Trade and in 1843 became president of the Board of Control of Indian affairs, from which he retired in 1846.

His son, George Frederick Samuel Robinson, First Marquis of Ripon (1827—), was born in London; served in the diplomatic corps; entered the House of Commons as Viscount Goderich in 1852; became Under Secretary for War in 1859 and Secretary in 1863; was made Secretary of State for India in 1866, and was Lord President of the Council from 1868 to 1873. In 1871 he was chairman of the joint committee on the Treaty of Washington. From 1880 to 1884 he was Viceroy of India, and made himself very unpopular among the English and greatly loved by the natives because of his favoritism for things Hindu. He was Secretary for Colonies from 1892 to 1895.

RIPON COLLEGE. A coeducational, undenominational institution at Ripon, Wis., founded in 1851 as Brockway College and opened in 1853. The present name was assumed in 1863. It was founded by the Winnebago Convention of Presbyterian and Congregational Churches. This Convention relinquished control, giving it into the care of an independent board of trustees in 1868. The larger part of the institution is the college proper, in which the B. A. degree is given on completion of four years' work in any of a number of groups of studies. There is also a preparatory school and a conservatory of music and art. The college has a library of 11,000 volumes, an endowment of $212,000, an income of $20,000, and six buildings valued, with the grounds, at $150,000.

RIPPERDA, rêp-pĕr'dȧ, John William, Baron, later Duke of (1680-1737). A political

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adventurer. He was born in Groningen, Holland, and at an early age entered the Dutch army. In 1715 he became Ambassador to Madrid; there he followed his friend Alberoni and turned Catholic. He was thereupon intrusted by the Spanish Government with the direction of commerce and industry, and became a favorite of King Philip V. and his consort, Elizabeth Farnese. In November, 1724, Ripperda went to Vienna and there concluded in 1725 a treaty of alliance between Spain and the Emperor Charles VI. Upon his return to Madrid in December, 1725, Ripperda was created duke and made Prime Minister. But neither Spain nor Austria was able to fulfill the terms of the treaty, and in consequence Ripperda was dismissed from office on May 14, 1726. He feared for his life and fled to the palace of Stanhope, the English Ambassador, and disclosed diplomatic secrets. The Spanish authorities thereupon seized him and confined him in the citadel of Segovia. He escaped after two years, went to Holland, and became a Protestant again. After a life of adventure in several countries, he appeared in the service of the Sultan of Morocco, and became a devout Mohammedan. He led an army against Spain, but was defeated at Ceuta in 1733, and was exiled to Tetuan, where he died. Consult: Moore, *Lives of Cardinal Alberoni and the Duke of Ripperda* (London, 1814); Syveton, *Une cour et un aventurier au XVIIIème siècle: baron de Ripperda* (Paris, 1896); Philippson, *The Age of the European Balance of Power* (Eng. trans., Philadelphia, 1902).

RIPPLE MARKS. Undulatory marks seen on the sand of the seashore or on the surface of sand dunes and often on the surface of snow drifts. Similar undulations also occur on soft bottoms at a depth of many feet beneath the surface of lake or sea water. In the former cases the ripple marks are produced essentially by the action of the wind, which is thrown into an undulatory motion by the slightest obstacle; when such motions are set up, the snow or sand that is carried by the wind is deposited in such a way that the ripples reproduce the movements of the air. At the bed of an ocean or lake the movement of the water may produce ripples by a precisely analogous process. Tidal sand ripples, cloud ripples, and wind ripples are shown by photographs in *Nature* for April 25, 1901.

RIP'PON, JOHN (1751-1836). An English Baptist minister. He was born at Tiverton, became a Baptist minister in London, 1773, and so continued till his death there. He edited *The Baptist Annual Register* (1790-1802), which has numerous biographical sketches of denominational interest, and he left behind him many works which were purchased by the British Museum in 1870. His most noteworthy service was as editor of a hymn book (London, 1787; 31st ed. 1844), which was long in use and which has been pronounced one of the most important and influential ever made.

RIP VAN WINKLE. A character in one of the tales in Washington Irving's *Sketch Book* (1819), a good-natured, intemperate Dutchman, who sleeps for twenty years in the Catskill Mountains, and returning to his home finds everything changed. The first dramatized form of the story was produced in 1828, followed by many others, until in 1866 Boucicault, with suggestions from Joseph Jefferson, produced the version which Jefferson made famous, first performed in London in 1865.

RISE OF THE DUTCH REPUBLIC, THE. A history of Holland by John Lothrop Motley (1856), from the abdication of Charles V., 1555, to the assassination of William of Orange in 1584. The story is told with dramatic intensity, being almost an epic with William of Orange, for whom Motley was an unqualified partisan, as hero.

RISH'ANGER, WILLIAM (c.1250-c.1312). An English chronicler, born probably in the village of Richangles in Suffolk. He joined the Benedictine monks of Saint Albans Abbey about 1271. His chronicle *Narratio de Bellis apud Lewes et Evesham*, continues the history of Matthew Paris, and gives a valuable account of the Barons' Wars from 1258 until 1267, with high praise for Simon de Montfort. It was edited by J. O. Halliwell-Phillipps for the Camden Society in 1840. Other works credited to him include *Willelmi Rishanger Monachi S. Albani Chronica* (1272-1806)—the last part of which he could not have written. It was edited by Riley for the Rolls Series, in 1865.

RISHI, rĭ'shê; *Skt. pron.* r''shê (Skt. *ṛṣi*, seer; connected with Av. *ərəši*, uprightness). The title given to the poets of the Vedic hymns, who were supposed to have received their divine inspiration through the sense of sight. The Sanskrit texts generally give seven as the number of these sages, although the Puranas (q.v.) mention nine, and Manu (q.v.) enumerates ten. At a later period the term was applied to certain classes of ascetics. In the Hindu system of astronomy, the seven rishis form the constellation of Ursa Major.

RISING SUN, ORDER OF THE. A Japanese civil and military order with eight classes, founded by the Mikado Mutsu Hito in 1875. The decoration consists of the national emblem, a rising sun composed of 32 white rays, with a central red medallion, and is suspended by green leaves and three blossoms of the Paulovnia from a white ribbon edged with red.

RISK (OF., Fr. *risque*, Sp. *riesgo*, risk; probably connected with Sp. *risco*, steep rock, Lat. *resecare*, to cut off, from *re-*, back again, anew + *secare*, to cut). In insurance law, this word is used to describe (1) the obligation of an insurer; (2) the chance or hazard that the peril insured against may occur and the insurer be held liable; (3) the probable or anticipated cause from which the loss may occur and against which the insured person is indemnified; and (4) the property or person which is the subject of the insurance. See INSURANCE.

The term is also employed in connection with the law of sales, both of real and personal property, to describe the chance that the goods may be destroyed before delivery. See SALE.

RISTIČ, rĭs'tĭch, JOHN (1831-99). A Servian statesman, born in Kraguyevats. He studied at Berlin, Heidelberg, and Paris, and began his official career in the Ministry of the Interior, under Prince Alexander Karageorgevitch. In 1858 he was made secretary to the embassy sent to Constantinople by Milosh Obrenovitch and became Servian representative at the Porte (1861-67). In the latter year he was appointed Servian

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Minister of Foreign Affairs, and when Michael Obrenovitch was assassinated he was the envoy sent from the provisional Government at Belgrade to bring Prince Milan from Paris. From 1868 to 1872, during the minority of Prince Milan, he was a member of the council of regency. In 1872-73 he was Premier and Minister of Foreign Affairs. He held the same offices in 1875 and 1876-80 as leader of the Liberals in alliance with the radical Nationalists. In this capacity he guided the national policy during the wars with Turkey in 1876 and 1877-78, the ultimate result of which was that Servia secured absolute independence and added territory. He went out of office in 1880, but remained the leader of the Liberal party in the national Parliament and was an active supporter of a Pro-Russian policy. In 1887-88 he was once more Premier. Ristić was at the head of the regency from King Milan's abdication (1889) to King Alexander's assumption of power (1893). He died in Belgrade, September 4, 1899. He was the author of several works on the foreign policy of Servia.

RISTORI, rē-stō'rē, ADELAIDE (1822—). A celebrated Italian tragic actress. She was born at Cividale, where her parents were strolling players. At the age of fourteen she was playing in *Francesca da Rimini*, and in a few years she became the leading Italian actress, a universal favorite because of her beauty and grace as well as her talents. Her marriage in 1847 with the Marquis Capranica del Grillo (who died in 1861) temporarily interrupted her dramatic career; but after two years she returned to the stage, and appeared at Rome in Alfieri's tragedy of *Myrrha*. The French attack on the city caused her for a time to desert the theatre for the hospital, where she employed herself assiduously in nursing the wounded. After having acted for several years at Rome and Turin with immense success, she presented herself before a French audience in 1855, when Rachel was in the height of her fame, a proceeding considered as a challenge by the first Italian actress to the first French actress. Even in Paris she obtained a triumph, notably in Legouvé's *Medea*, which had been rejected by Rachel. Two of her other great rôles were Schiller's Mary Stuart and Giacometti's Elizabeth. In London, in 1856, she met with great success as Lady Macbeth. She visited the United States in 1866, 1875, and 1884-85. Consult her autobiography, *Ricordi e studj artistici* (Turin, 1887; Eng. trans., *Studies and Memoirs, a Biography*, Boston, 1888); Boutet, *A Ristori* (Rome, 1899.

RITARDANDO, rē'tär-dän'dō. A term in music, indicating that the passage to which it applies is to be played slower and slower, with a steady retard.

RITCHIE, rĭch'ĭ, ALEXANDER HAY (1822-95). An American engraver and painter, born in Glasgow, Scotland. He was a pupil of Sir William Allen at the Royal Institution, Edinburgh, and came to the United States in 1841. He worked both as a painter and as an engraver in Canada for a short time, and then settled in New York City, where he was elected to the National Academy in 1871. His mezzotint engravings are particularly well known. They include plates after Huntingdon's "Lady Washington's Reception Day" and Darley's "On the March to the Sea." His oil paintings include "Mercy Knocking at the Gate" (1860); "Fitting Out Moses for the Fair" (1862), and several portraits.

RITCHIE, ANNA CORA MOWATT (1819-70). An American actress. She was the daughter of S. G. Ogden, of New York, but was born at Bordeaux, France. She was married at fifteen years of age to James Mowatt, a New York lawyer. After appearing in private theatricals, then in public readings, she studied for the stage and made her début in *The Lady of Lyons* at the Park Theatre in 1845. Later she toured with E. L. Davenport in the United States and went with him to England, where she appeared in 1847 in Manchester, then in London, and became leading lady at the Marylebone Theatre, acting with him through many engagements. Her husband having died abroad, she returned to America, and in 1853 retired from the stage. In 1854 she married W. F. Ritchie, editor of the Richmond *Examiner*. He died in 1868, and she thenceforth resided in England and corresponded for American newspapers. She was the author of several plays, among them *Fashion* (produced in 1845) and *Armand* (1847), and a number of novels, of which may be mentioned *The Fortune-Teller* (1842), *Evelyn, or a Heart Unmasqued* (1845), and *Fairy Fingers* (1865). Consult also her *Autobiography of An Actress* (Boston, 1854).

RITCHIE, ANNE ISABELLA (1838—). An English author, the eldest daughter of Thackeray. She was born in London, and was educated in Paris. She married her cousin, Richmond Ritchie, in 1877. Her works consist of novels and critical studies, written in a graceful, lucid style, which show skill in character drawing, and which are full of discriminating touches and keen observation. They include *The Story of Elizabeth* (1863), *The Village on the Cliff* (1865), and a notable edition of the works of Thackeray (1898).

RITCHIE, CHARLES THOMSON (1838—). An English statesman, born in Dundee. He became a well-known merchant in London, from 1874 to 1885 sat in Parliament for the Tower Hamlets as a Conservative, and from 1885 to 1892 for Saint George's-in-the-East. In 1885-86 he was secretary to the Admiralty, in 1886-92 president of the Local Government Board, in which capacity he accomplished important reforms in provincial administration, and in 1895-1900 was president of the Board of Trade. He became Secretary of State for the Home Department in 1900, and, in 1902, Chancellor of the Exchequer, which office he resigned in 1903. In 1895 he was elected member for Croydon.

RITCHIE, DAVID GEORGE (1853-1903). A Scotch philosopher, born at Jedburgh, and educated at Edinburgh University (1869-74) and at Balliol College, Oxford (1874-78). He was fellow of Jesus College from 1878 to 1894, being tutor at that college from 1881 and at Balliol from 1882 to 1886, and in 1894 became professor of logic and metaphysics at Saint Andrews. For the year 1898-99 he was president of the Aristotelian Society. Ritchie contributed several articles on Greek philosophy to Chambers's *Encyclopædia* and on various subjects to Palgrave's *Dictionary of Political Economy*; edited *Early Letters of Jane Welsh Carlyle* (1889); and published *Darwinism and Politics* (1889), *Principles of State Interference* (1891), *Darwin and Hegel* (1893),

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Natural Rights (1895), *Political and Social Ethics* (1902), and *Plato* (1902).

RITCHIE, THOMAS (1778-1854). An American journalist, born in Essex County, Virginia. After studying medicine and doing some teaching he removed to Richmond and became editor of the *Examiner* in 1804. He changed its name to *Enquirer*, and remained its editor and proprietor till 1845, when at the request of President Polk he gave it up to his sons and removed to Washington. There he founded the *Union* as the official organ of Polk's Administration. In 1849 he retired and spent his last years in Richmond. He was a States-rights Democrat and a born editor, full of pugnacity and Scotch stubbornness. He made the *Enquirer* a power through the Union, and was himself an important figure in contemporary politics.

RITE (Lat. *ritus*, custom; connected with *riti*, way, usage, *ri*, to flow). A religious act performed according to an established order, determined by rule and usage. In established religions, worship must be carried on in a specified manner, by particular persons, and at special times and places, while its conduct requires training in the celebrant, who usually belongs to an order of priests. The hymns of the Rig Veda, as compared with Hindu faiths of subsequent ages, show incomparably greater directness and simplicity. From these and similar cases it has been inferred that acts of worship were originally not limited by prescribed form, but might take place at any time and be performed by any individual at his own pleasure. If this doctrine were accepted the history of rites would be relatively modern. Recent investigations, however, have placed a different face on the matter; in North America, at least, aboriginal worship appears to have been ritualistic to an extraordinary degree. The Navahos, for example, possess elaborate ceremonies, of which many are of nine days' duration. So complicated are these, that to become a chanter is the task of many years, and no one person can perfectly know more than one rite. These offices are performed primarily in order to heal the sick, but have also the secondary purpose of securing temporal blessings of all sorts, of bestowing amusement and social pleasure, and in general of gratifying religious emotions. Other ceremonies are efficacious in planting, harvesting, building, war, nubility, marriage, travel, and rain-bringing. In their celebration means are employed which answer to the elements of ritual in other continents, such as prayer, sacrifice, singing, dancing, incense, music, painting, procession, and casting of sacred meal. In the ordering of the service the most minute accuracy is required; for example, use is made of 'kethawns,' or plumed prayer-sticks, which are conceived as conveying messages to the gods. Each of these wands has its own special symbolism, must be offered in a particular manner, and laid in a particular direction, so as to convey its tidings to one special deity. When the bearer of the sacrifice leaves the lodge, he proceeds in a direction leading toward a selected place; after he has deposited his offering, he turns to the right and returns by a sunwise path. He must not cross the trail taken in coming, must not cross an ant-hill, and must run during the whole of his route. In the course of the ceremony songs are chanted, which are traditional, having been handed down by word of mouth perhaps for centuries; these must be known with exactness, for any error made in singing, even to the misplacing of a single vocable, will be fatal to the efficacy of the rite. The songs are not isolated, but divided into groups, which must follow in established order, and each has a place in its own group which must not be changed, under penalty of divine displeasure, and the officiating priest is obliged to remember this place, though the series may contain some two hundred or three hundred pieces. During the function, each day and each night has its own ordained duties. Although the performances of the Navahos may excel in precision and variety, yet the same character of ritualism seems to belong to Indian tribes through North and South America. If not found among any particular race, the deficiency may be attributed either to imperfect record, or to the social conditions which have brought into abeyance an earlier ceremonial religion.

The question presents itself, how far the principles applicable to American ritual may be taken to represent general early religious custom. For the answer to this inquiry material is as yet hardly accessible. It may be affirmed, however, that the evidence accessible seems to imply that the Indian ritual was typical. Among the Australians all tribes appear to have elaborate ceremonies, exhibiting many similar features. Throughout Africa full and detailed accounts have not yet been obtained representing the tribal ceremonies in which correspondence would be looked for. Early Egyptian art makes it clear that before the construction of the first pyramids there existed elaborate rites, in which stories of gods were acted out in dance, song, masquerade, and procession. Although Greek and Roman literature has failed to preserve detailed accounts of local worship, it is certain that every district and temple at one time had its own mysteries, sacred dramas, and exact observance of ceremony.

RITES, CONGREGATION OF. A committee of cardinals in the Roman Catholic Church, founded by Pope Sixtus V. (1585-1590). The number of members has varied from time to time. They are assisted by consultors and minor officials. It takes cognizance of the liturgy, the rites pertaining to the sacraments, the rubrics of the missal and breviary, the ceremonies of the Church in its public functions, such as the feasts, the due reception of exalted personages, in order to secure uniformity and reasonable consistency, and the canonization of saints. The congregation meets at the house of the prefect, who is the senior cardinal of the congregation; but it has an office, the Palazzo della Cancelleria Apostolica, Rome. Consult Bangen, *Die römische Curie* (Münster, 1854).

RITSCHL, rich'l, ALBRECHT (1822-89). A German Protestant theologian, the founder of one of the most important schools of theological thought of the present time. He was born in Berlin. His boyhood was spent in Stettin, his father having been Bishop and general superintendent of the Evangelical Church in Pomerania from 1827. He studied at Bonn, Halle, Heidelberg, and Tübingen. In 1846 he became docent at Bonn, professor extraordinary of theology in 1852, and full professor in 1859. In 1864 he was called to Göttingen, where he died,

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March 20, 1889. Ritschl ranks high both as an historian and as an exegete, but he is most widely known as a theologian. His theology was of the subjective type. He was filled with a desire to know the essence of Christianity apart from what he termed its 'accidents.' Man and his spiritual needs became the centre of his system. He claimed that the first prerequisite of theological culture was a clear understanding of the Christian idea of reconciliation, and this, with the accompanying doctrine of justification, was at one time the burden of his teaching. His thought, however, may be said to have been in a state of continual flux. He passed through every stage of current religious thought, and, though widely learned, he had no sense of proportion in doctrine. Yet he furnished a rare fund of suggestion to his pupils, and, especially in his later years at Göttingen, gathered about him a circle of enthusiastic and devoted disciples. Aside from lectures, addresses, sermons, and numerous reviews, Ritschl's most important publications were: *Die Entstehung der altkatholischen Kirche* (1850; 2d ed. 1857); *Ueber das Verhältnis des Bekenntnisses zur Kirche* (1854); *Die christliche Lehre von der Rechtfertigung und der Versöhnung* (1870-74; 3d ed. 1888-89; Eng. trans. 1872-1900); *Schleiermachers Reden über die Religion und ihre Nachwirkung auf die evangelische Kirche Deutschlands* (1874); *Unterricht in der christlichen Religion* (1875; 5th ed. 1895); *Geschichte des Pietismus* (1880-86); *Theologie und Metaphysik* (1881); *Fides Implicita* (1890). Two volumes of *Gesammelte Aufsätze* were published after his death (1893-96).

The RITSCHLIAN SCHOOL of Theology grew out of, but does not uniformly reflect, the teaching of Ritschl. Strictly speaking, it is a movement rather than a school, and it has been aptly described as an organic evolution. Its development is incomplete and there is wide divergence of views among its members. It may be described from one point of view as Christianity apart from creeds and from another as theistic altruism. Its watchwords are: "Theology without metaphysics" and "From ethics to religion." Like Ritschl, it resents the metaphysical nomenclature in which the great Christian verities have been expressed, and also claims that men should first be incited to work in the kingdom of God and thus reach out from that vantage ground to the religious thought of the kingdom. It claims that preaching should be disburdened of such doctrines as the Trinity, the Incarnation, and the Atonement, and that the gospel miracles, the resurrection of Jesus Christ, and the unpleasant fact of sin should be thrust into the background of all teaching, so as not to keep men of intelligence and culture from embracing Christianity. The tendency of the movement is away from overdefining and in favor of great liberty and elasticity of thought and expression. The Ritschlians attempt, by surrendering the supernatural element in religion, as a concession to modern critical thought, and by abandoning all discussions of metaphysical questions in theology, to save belief in Christ and in human redemption as "judgments of worth or value," which, though not actually capable of theoretic proof, are yet the very essence of religious life and knowledge. The movement is widespread and influential; its disciples hold chairs in the principal German universities; the spirit of their teaching has penetrated Continental theology and made its influence felt widely in England and America.

BIBLIOGRAPHY. The life of Ritschl has been written by his son, Otto Ritschl, professor at Bonn (Freiburg, 1892-96). Works treating of his teaching and the Ritschlian school are numerous; the following may be mentioned, most of which contain extensive bibliographies: Pfleiderer, *Die Ritschlsche Theologie kritisch beleuchtet* (Brunswick, 1891); Schoen, *Les origines historiques de la théologie de Ritschl* (Paris, 1893); Mielke, *Das System Albrecht Ritschls* (Bonn, 1894); Denny, *Studies in Theology* (London, 1894); Orr, *The Ritschlian Theology and the Evangelical Faith* (New York, 1899); Swing, *The Theology of Albrecht Ritschl*, with *Instruction in the Christian Religion*, translated from the 4th German edition (ib., 1901); Brown, *The Essence of Christianity* (ib., 1902); Garvie, *The Ritschlian Theology, Critical and Constructive* (ib., 1902).

RITSCHL, FRIEDRICH WILHELM (1806-76). A German philologist. He was born at Grossvargula, in Thuringia, April 6, 1806. He studied at Leipzig under Hermann, and from 1826 to 1829 at Halle. In 1833 he was called to Breslau as extraordinary professor. In 1834 he became full professor, and he spent the winter and spring of 1836-37 on a tour through Italy. In 1839 he went to Bonn as professor of classical literature and rhetoric. His first literary works were devoted to the Greek grammarians, as the edition of Thomas Magister (Halle, 1832), the treatise *De Oro et Orione* (1834), and the *Die Alexandrinischen Bibliotheken und die Sammlung der Homerischen Gedichte durch Pisistratus* (1838), prove; but by far his greatest work is his edition of Plautus (1848-53). Subsequently he devoted himself to a systematic treatment of Latin inscriptions, with the view of illustrating the history of the Latin language, and published a long series of epigraphical studies, followed in 1862 by his monumental folio *Priscæ Latinitatis Monumenta Epigraphica*. He died November 8, 1876. His life has been written by Ribbeck (2 vols., Leipzig, 1879-81) and Müller (Berlin 1877).

RIT'SON, JOSEPH (1752-1803). An English antiquary, born at Stockton-on-Tees. He studied law, and practiced as conveyancer. Afterwards he was appointed high bailiff of the liberty of the Savoy (1784), a position he held for life. He was a man of learning, but of peculiar disposition, and a savage critic. Warton, Johnson, Steevens, Malone, Bishop Percy, Pinkerton, and others were the subjects of his bitter pen. His works include: *Observations on Warton's Three First Volumes of the History of English Poetry* (1782); *Cursory Criticisms* (1792); *Bibliographica Poetica: a Catalogue of English Poets of the XII.-XVII. Centuries* (1802); *Ancient English Metrical Romances* (1802); and several collections and anthologies. Consult: Haslewood, *Some Account of the Life and Publications of the late Joseph Ritson, Esq.* (1824), and Nicholas, *Letters of Joseph Ritson, Esq., with a Memoir* (1833).

RIT'TENHOUSE, DAVID (1732-96). An American astronomer and maker of astronomical

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instruments, born in Pennsylvania. When 12 years old, he inherited a small library containing a few works on mathematics and among them Newton's *Principia*. In 1751 he adopted clock-making as a profession. He soon established a reputation as an astronomer and instrument-maker of unusual ability, and in 1763 was engaged to determine the boundary line since known as Mason and Dixon's line, for which he used instruments of his own construction. He was subsequently called upon to settle the boundaries between New York, New Jersey, Pennsylvania, and several other States. Soon after he made two orreries, one for Princeton College and one for the University of Pennsylvania. Rittenhouse was appointed by the American Philosophical Society to observe the transit of Venus, June 3, 1769. After 1770 he lived in Philadelphia, and was a member of the convention that framed the first State Constitution. He also served as the first State Treasurer (1777-89) and director of the Philadelphia mint (1792-95). He was professor of astronomy in the University of Pennsylvania (1779-82), and was a member of many learned societies, including the American Academy of Arts and Sciences, the Royal Society of London, and the American Philosophical Society, of which he was president after Franklin's death (1791). Most of his scientific papers appeared in the *Transactions* of the American Philosophical Society. Consult the *Memoir* by William Barton (1813).

RITTER, August (1826—). A German civil engineer, born at Lüneburg, and educated at the Polytechnic Institute at Hanover, and at Göttingen. He was a practicing engineer for some time, in 1856 became teacher of mechanics and construction of machinery at Hanover, in the Polytechnic Institute, and in 1870 became professor in the School of Technology at Aix-la-Chapelle. He is best known as the author of Ritter's method of reckoning arches for bridges and roofs. He wrote *Elementary Theory and Calculation of Iron Bridges and Roofs* (German, 1863, 5th ed. 1894; Eng. by Sankey, 1879), *Lehrbuch der technischen Mechanik* (1864; 7th ed. 1896), *Lehrbuch der Ingenieur-Mechanik* (1874-76), and *Lehrbuch der analytischen Mechanik* (2d. ed. 1883).

RITTER, Frédéric Louis (1834-91). A German-American composer, born in Strassburg. He studied under Moritz, Hauser, and Schletterer. In 1856 he came to the United States, resided for some years in Cincinnati, where he founded the Cecilia and Philharmonic societies, and in 1861 removed to New York City and conducted the Sacred Harmonic and Arion societies. In 1867 he organized a musical festival, which he conducted in New York, and was soon after appointed professor of music at Vassar College, which post he held till his death. He published many songs, orchestral, church, and pianoforte music, and several musical works, including *History of Music* (1870-74), *Music in England* (1883), and *Music in America* (1883). He died in Antwerp.

RITTER, Heinrich (1791-1869). A German historian of philosophy. He was born at Zerbst, Anhalt, November 21, 1791; studied theology and philosophy at Halle, Göttingen, and Berlin, and in 1824 was created professor extraordinarius at Berlin University. In 1833 he accepted a call to the university at Kiel, and went thence in 1837 to Göttingen. His great work, *Geschichte der Philosophie* (Hamburg, 1829-53; 2d ed., vol. i.-iv., 1836-38), is still of value. In addition he wrote works on logic, metaphysics, and ethics. Ritter was largely influenced by Schleiermacher. He died February 3, 1869.

RITTER, Henry (1816-53). A Canadian genre painter, born at Montreal. He studied under Gröger in Hamburg and under Karl Ferdinand Sohn at Düsseldorf. Among his characteristic and finely colored episodes from the life of sailors and fishermen, showing the influence of Rudolf Jordan, the most prominent are: "Braggart in Sailor's Tavern" (1841); "Offer of Marriage in Normandy" (1842, Leipzig Museum); "Drowned Son of the Pilot" (1844, Ravené Gallery, Berlin); "Poacher Before Justice of the Peace" (1847), his largest painting; "Prairie Fire" (1851, Kunsthalle, Hamburg); "The Son's Last Letter" (1852, Kunsthalle, Bremen); and "Middy's Sermon" (1853, Cologne Museum).

RITTER, Karl (1779-1859). An eminent German geographer. He was born at Quedlinburg, Prussia, in 1779, and was educated in the famous school of Salzmann at Schnepfenthal and at Halle University. His earliest geographical studies were printed in a paper published for the young, and attracted wide attention. His six maps of Europe were published in 1806 and his *Geography of Europe*, in two volumes, five years later. In 1816 he completed in Berlin the first volume of *Die Erdkunde*, his monumental geographical work, and a part of it was published in the following year. The whole of the first volume did not appear until 1832, and the following volumes were issued from the press in rapid succession. *Die Erdkunde* is the fullest encyclopædia of geographical lore. In this work Ritter unfolded and established the treatment of geography, as a study and a science, which has been indorsed and adopted by all geographers. He presented the earth's surface in its relations to nature and to man and as the foundation of the study of the physical and historical sciences. All the physical geographies of to-day profoundly show the influence of Ritter's writings. His position as a teacher became as eminent as his rank as a geographer. Many of Ritter's writings were printed in the *Monatsberichte* of the Berlin Geographical Society, and in the *Zeitschrift für allgemeine Erdkunde*. His *Geschichte der Erdkunde und der Entdeckungen* (1861), *Allgemeine Erdkunde* (1862), and *Europa* (1863) were published posthumously. Some of his works have been translated into English by W. L. Gage: *Comparative Geography* (1865), and *The Comparative Geography of Palestine and the Sinaitic Peninsula* (1866). Consult the *Life* by W. L. Gage (Edinburgh, 1867) and Kramer (Halle, 1864; 2d ed. 1875).

RITTER, Paul (1829—). A German architectural painter and etcher, born at Nuremberg. He was deaf and dumb from the fourth year of his life. A pupil of Heideloff, he engraved for publishers in Berlin, Stuttgart, and Nuremberg. About 1870 he took up painting in oil and acquired considerable reputation with his interiors and street views of Nuremberg, richly supplemented with historical figures, such as "Interior

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of Church of St. Lawrence" (1874); the "Schöne Brunnen" (1880); "Entry of Procession with the Crown Jewels into Nuremberg in 1424" (1883, City Hall, Nuremberg); "Entry of Gustavus Adolphus in 1632" (1886); "Emperor Matthias Leaving the Kaiserburg in 1612" (1890); and "Monument of Saint Sebaldus." In 1888 the title of royal professor was conferred on him. His brother LORENZ (1832—), born at Nuremberg, pupil of Heideloff, also painted (chiefly in water colors) and etched numerous architectural views in his native city and some subjects from North Italy.

RITTERSHAUS, rit'tĕrs-hous, EMIL (1834-97). A German lyrist, born at Barmen. His poetry, marked by simple feeling, fine diction, and original matter, won great popularity. The best known of his works are: *Gedichte* (1856; 8th ed. 1891); *Am Rhein und beim Wein* (1884; 3d ed. 1893); *Buch der Leidenschaft* (1886); and *In Bruderliebe und Brudertreue* (1893).

RITUAL (Lat. *ritualis*, relating to rites, from *ritus*, rite; connected with Skt. *riti*, course, custom, from *ri*, to flow). The name of one of the service books of the Roman Church, in which are contained the prayers and order of ceremonial employed by priests in the administration of certain of the sacraments and other offices of the Church. Substantially in its present form it dates from the Council of Trent, which directed a revision of all the different rituals then in existence.

RITUALISM. A term popularly applied to the remarkable development of Church ceremonial which grew out of the Oxford Movement (q.v.) and gathered about the service of the Holy Communion, in the Church of England. The ritualistic movement may be said to date from 1863, or even earlier. There were Church riots in East London springing from this cause in 1859. The assertion of the doctrine of the Real Presence (see LORD'S SUPPER) and its concomitant, the Eucharistic Sacrifice, resulted in a marked development of ceremonial. It is no exaggeration to say that a present-day 'high celebration' of the Holy Eucharist in an 'advanced' church is characterized by a detailed and elaborate ceremonial with which the earlier Tractarians had no acquaintance. The chief warrant for the new ritual is found in what is known as the "Ornaments Rubric" (q.v.) in the English Prayer Book. But the ritualistic, so called, find additional sanction for their ceremonial in the language of Canon xxx. of 1603, which, they assert, establishes the unity of the Church of England with other 'branches' of the Catholic Church and gives them the right to use all ceremonies which are primitive and catholic. They further contend that in the 36th article, on "The Consecration of Bishops and Ministers," it is expressly declared that the old Latin ordination services of the time of Edward VI. contain nothing 'superstitious or ungodly,' that a celebration of the Holy Communion, according to the liturgy of 1549, formed an integral part of these ordination services, and that such a celebration involved the use of all sorts of pre-Reformation rites and ceremonies—all, in fact, that are contended for by the advanced school at the present day. They also cite in support of their practices the numerous lists of ornaments found in the ancient records of parish churches in Edward VI.'s time and the inventories taken by a commissioner appointed in 1552, which "specify a number of appliances and usages over and above those mentioned in the first Prayer Book of Edward VI." They contend, in fact, that every vestment, ornament, and movable thing used in the Church services before the Reformation and every ceremony involved in its use are now perfectly legal, unless expressly forbidden or by implication done away with by rubrical or other proper authority. The result is the complete transformation of the Church's worship as it was celebrated in the middle of the last century. The 'six points' of ritual are insisted upon. These are the Eucharistic vestments (see COSTUME, ECCLESIASTICAL); the eastward position for the celebrant at the altar; the use of unleavened or wafer bread; the mixed chalice; incense; and altar lights.

In England several attempts have been made to suppress these ritualistic practices. In 1867 the Government appointed a commission "to inquire into the rubrics, orders, and directions for the regulation of the conduct of public worship." In 1874 the Public Worship Regulation Act was passed. Its object, as expressly declared by the Prime Minister, Disraeli, was to "put down Ritualism," and its most significant provision was the appointment of a State-made judge before whom ritual cases might be brought. In 1890, before Archbishop Benson and his episcopal assessors, Bishop King of Lincoln was tried for unlawful practices in the celebration of Holy Communion. The specifications were allowing two lighted candles on the altar, mixing water with the wine, assuming the eastward position, permitting the *Agnus Dei* to be sung, making the sign of the cross at the benediction, and taking part in a ceremonial ablution of the sacred vessels. On strict legal grounds, all of these except the sign of the cross were upheld, at least with qualifications. An appeal was made to the Privy Council, which sustained the Archbishop. In 1899 the legality of the ceremonial use of lights and incense and the reservation of the Sacrament was argued before the Archbishops of Canterbury and York, and the decision was adverse to the ancient practices.

But legislation has practically failed of its object. Several English clergy went to prison rather than obey the mandates of a secular court in things spiritual. The interference of the State in the teaching and practice of the Church was resented and firmly resisted. Even the archbishops' decisions were held to be but 'opinions,' and any weight attaching to them was deemed moral rather than legal. The movement, as represented by the English Church Union, under the leadership of Lord Halifax, has gone steadily on. The advanced school has been recognized by the Government in the selection of a certain number of bishops from its ranks. The comprehensiveness of the national Church has been admitted. Most of the practices in debate have been either explicitly or tacitly recognized. The onus of the solution of the difficult problem of ritual rests largely upon the bishops, and their fatherly counsels generally result in the suppression of extreme practices.

In the American Church the absence of any connection with the State has made the history altogether different. But the advance in ritual on the one side and the opposition to it by ecclesiastical means on the other have run a similar

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course. The controversy raged most hotly between 1865 and 1880, and numerous attempts were made to obtain definite legislation on the subject. In the absence of any detailed prescription in ritual matters, the advanced school contended that the law of the Church of England held good in her daughter Church. In 1874 a canon was passed by the General Convention which made it the duty of the bishops to proceed against any minister accused of introducing unauthorized ceremonies or practices setting forth erroneous or doubtful doctrines, especially the elevation or adoration of the elements in Holy Communion, and all other like acts not authorized by the rubrics of the Prayer Book. But the canon was practically a dead letter from the first, and, as in England, ritual observances which fifty years earlier would have raised a tempest of opposition are now common among the most moderate churchmen. The movement in favor of a more ceremonial conduct of divine worship has spread far beyond the limits of the Anglican Communion, and among Presbyterians (especially in Scotland), Methodists, and other Protestant bodies, there have been numerous instances of the introduction of ceremonies hitherto unheard of, all tending in the same direction. Consult: MacColl, *The Reformation Settlement* (London, 1899); several essays in Shipley, ed., *The Church and the World* (ib., 1866); Walker, *The Ritual Reason Why* (ib., 1867); Gladstone, *The Church of England and Ritualism* (ib., 1876); Parry, *Report of the Royal Commission on Ritual* (ib., 1867); Balfour, "How the Ritualists Harm the Church," in *North American Review* (New York, 1899); Barry, "What is Ritualism?" and Corrance, "The Development of Ritualism," in *Contemporary Review* (London, 1898); Gallwey, *Twelve Lectures on Ritualism* (ib., 1879); Roscoe, ed., *The Bishop of Lincoln's Case* (ib., 1891).

RIVALS, The. A comedy by Richard Brinsley Sheridan, produced January 17, 1775. On its first representations it was almost a failure, but it has since held the stage more successfully than most eighteenth-century plays. It has more action, though less brilliancy, than *The School for Scandal.* The rivals are Bob Acres and Beverly (Captain Absolute), who contend for Lydia Languish. Acres challenges Captain Absolute by Sir Lucius O'Trigger, but finding he is a friend, declines to fight. Mrs. Malaprop, with her delightful blunders, supplies a large part of the humor of the play.

RIVAS, rē'vȧs. The capital of the Department of Rivas, Nicaragua, 50 miles southeast of Managua (Map: Central America, E 5). It is the centre of a rich cacao-producing region, and manufactures and exports chocolate. It occupies the site of the ancient Indian town of Nicarao. Population, in 1895, 12,000.

RIVAS, Angel Perez de Saavedra, Duke of (1791-1865). A Spanish soldier, statesman, and poet, born in Cordova. He entered the army in 1807, and fought through the Spanish war of independence, retiring from the service in 1815. He participated in the revolution of 1820, was Secretary of the Cortes in 1821, and was forced to leave the country in 1823, residing in England, Malta, and France. He returned to Spain in 1834, came into possession of the ducal title of Rivas, and became Minister of the Interior in 1836. He was again forced into exile from 1837 to 1843. Then he was for five years Spanish Ambassador at Naples. He was afterwards Ambassador at Paris (1856), and at Florence (1860). His fame as a national poet began in 1813 with the publication of *Ensayos poéticos.* Other works of his are the epics *Florinda* (1825) and *El moro expósito* (1834), the plays *Tanto vales cuanto tienes* (1834), *Don Alvaro* (1835), and *La morisca de Alajuar* (1842), and the *Historia de la sublevación de Nápoles* (1848). His *Obras completas* have been edited by his son.

RIVE, rēv, De La. See De La Rive.

RIVE-DE-GIER, rēv'de-zhē'ȧ'. A town in the Department of Loire, France, on the Gier, 19 miles southwest of Lyons (Map: France, L 6). It is in one of the best coal fields in France, and has over fifty coal mines, also iron works, glass works, and silk factories. Exports are facilitated by canal communication with Givors, on the Rhone. Population, in 1901, 16,087.

RIVÉ- (rē'vā') **KING,** Julie (1859—). An American pianist born of French parents in Cincinnati. She studied under William Mason and S. B. Mills in New York, Carl Reinecke in Leipzig, and Liszt in Weimar. Her début occurred in Leipzig in 1873. The following year she returned to Cincinnati and in 1875 appeared at a Philharmonic concert in New York. She subsequently gave many concerts with the Thomas and Seidl orchestras and became well known as a brilliant concert pianist. Her compositions are for the piano, and enjoy considerable popularity.

RIVER (OF. *riviere,* Fr. *rivière,* from ML. *riparia,* shore, river, fem. sg. of Lat. *riparius,* relating to a shore, from *ripa,* shore). A natural drainage line on the land, which, in addition to carrying off the surface water, always bears a load of mineral matter in suspension and solution. The water supply is derived from the rain or melting snow and from underground, whence it reaches the surface by seepage or in the form of springs. It is this latter source of supply which causes so many rivers to maintain their flow even when no rain has recently fallen. The load of mineral matter is obtained partly by solution in the passage of the water through the soil or rock, partly by the mechanical wearing or corrosion of the stream bed, and partly by the supplies furnished by the rain-wash and weathering of the valley sides. In the course of this runoff the water forms a valley which varies in size and characteristics. Usually this valley is on the surface of the land, though occasionally beneath the surface, as in Mammoth Cave of Kentucky.

Most rivers flow from higher country into lakes, or into the sea; but in arid countries many streams terminate on the land because the river water sinks into the ground and evaporates. The Western United States offers many illustrations of these conditions. In such arid regions the large rivers that are fed by a permanent supply from the mountains are often able to maintain their course across even desert regions. The Nile of Egypt and the Colorado of Utah and Arizona are illustrations of such rivers.

From the headwaters to the mouth a river has a slope which varies from one part to another. Ordinarily the steepest slope is near the head and the most gentle near the mouth, where the stream commonly flows quietly through a flood

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plain. This difference in slope is due to the fact that, in the normal development of its valley, a stream does its earliest and most effective work near the lower portion, where the volume is greatest, while the rills and creeks of the headwaters have had less time for their work. They also have less water with which to work, and, being higher, they have a greater task to perform in cutting down their slope. Hence the headwater streams may be vigorously at work excavating their valleys long after the lower course has been reduced to its *profile of equilibrium*—that is, the easiest slope down which the river water with its sediment load may pass.

The condition of the river slope, the valley form, and most of the peculiarities of rivers depend in such large measure upon the stage in development which the river has reached in its task of valley formation that it seems quite essential, in attempting to give an adequate statement of the variations in rivers, that we should first of all consider the question of river-valley development.

Let us imagine a new land for the first time exposed to the air. The rain that fell upon it would run off down the easiest slope and quickly carve a channel which would necessarily be steep-sided. Such a condition as this is illustrated in southern Florida, where the raised sea bottom is so level that the run-off is retarded and the rivers expand into many shallow lakes and swamp tracts. It is also illustrated on the coastal plains of Texas, where shallow, steep-sided valleys are cut in the soft strata of the low-lying plains.

At the same time that the river is rapidly excavating along its bed, the weather—rain, frost, etc.—is much more slowly attacking the valley walls; but so long as a stream can cut along its channel the deepening will proceed with much more rapidity than the widening. That is to say, the valley form will be that of a gorge. When, however, the stream has reached the limit of its power to cut vertically, that is when it has reached its *base level*, the slow process of broadening under the action of weathering, being in excess, reduces the slope of the valley walls. Therefore the river valley broadens out. Naturally the rate of broadening of a valley will vary according to many conditions, two of the most important of which are the nature of the rock and the climate. Many of the scenic features of river valleys depend upon the influence of rock structure in retarding or accelerating weathering. The Colorado Cañon of Utah and Arizona furnishes numerous examples of this; and it also stands as a type of the effect of climate in retarding valley development. The Colorado is topographically a young stream, but its valley is much less broad and much steeper than it would be had it been formed in a moist climate.

In the course of erosion a river excavates more rapidly in the soft than in the hard layers. It therefore locally so increases its slope as to introduce rapids or even falls in its course. The Niagara gorge and falls offer an excellent illustration of this phase. There are numerous other causes for waterfalls than this most common one; for example, the two Yellowstone falls occur where two hard vertical dikes occur in the softer, partly decomposed lava. The Yosemite falls are apparently due to excavation of the main Yosemite valley by a glacier which passed down that valley; and in the Alps and the fiords of Norway falls of similar origin abound. Where lava flows have interfered with the stream courses waterfalls have resulted by the action of the river in excavating a new valley in the lava, as at the Shoshone Falls of Idaho and Spokane Falls of Washington.

The glacial interference with rivers is responsible also for the lakes which abound in Northern Europe and America. It is to this cause that the peculiarities of the Saint Lawrence system, by which there are alternate expansions of water and narrow river-like stretches, are due. The importance of these lake expanses of rivers is not confined to their usefulness in navigation; they also serve to regulate the flow of water. The rise of a few feet in a lake requires a long time for the corresponding discharge into the river to be completed. This checks the floods and furnishes an explanation of the fact that such a river as the main stream of the Saint Lawrence system is free from destructive floods. A lake also acts as a filter to river water, and the outflowing stream is therefore practically free from all mineral load excepting that held in solution. By this means the river has its power of excavation greatly decreased, since the tools with which it works in corrasion are rock fragments in suspension. It thus happens that the outlets of lakes are rarely deep valleys of erosion.

Ordinary rivers are subjected to variations in the depth of water and in the quantity of discharge per minute. With the rapid melting of the snow in spring, or at times of heavy rains, the volume of the river is greatly increased and its erosive power is very much greater than at ordinary times. In a large river with many branches a great rise is usually the result of the combination of marked increases in the volume of water supplied by numerous branches. At such times the river commonly rises until the channel is no longer able to hold it. Spreading out over the surrounding country, it floods the land, and, instead of a single thread of water, there may be a vast sheet miles in width, as in the case of the lower Mississippi valley. When the flood subsides a thin layer of sediment is left behind, and this, in the course of time, builds up a broad flat plain, known as the flood plain (q.v.), whose level is just below that of the level of the ordinary floods. The flood-plain soil is so fertile and productive that river flood plains are among the most densely populated parts of the earth; and for protection from the floods the people have found it necessary to build levees to confine the river to its channel. Such control of rivers cannot be made permanently successful, since the sediment that accumulates on the flood plain is then in part deposited in the channel, thus building it up. After a while, therefore, the river must leave its higher channel for the low ground to one side. It is because of the frequent changes of this sort in the Yellow River of China, accompanied by terrible destruction of life and property, that the Yellow River has been called 'China's Sorrow.' See INUNDATION.

The flood plains of rivers often merge into a delta (q.v.). In fact, some flood-plain sections, as the lower Nile, were first built as deltas. Wherever a stream carries sediment into the sea the accumulation that settles tends to produce a delta; and if the coast line remains at a

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uniform level long enough, or if it is slowly rising, a delta will actually be built. But where the movement of the land is downward, or has recently been one of subsidence, deltas cannot be expected. This explains the absence of deltas in Northeastern America and Northwestern Europe, and accounts for the many bays, estuaries, and fiords; for in these sections the lowering of the land has drowned the seaward ends of the valleys and transformed them into arms of the sea. Thus the lower Hudson below Troy is for 150 miles an estuary and not a true river. The true Hudson is the portion from the Adirondacks to Troy, and that below may be called a tidal river.

By the mineral load which rivers carry, important work is being performed. A large variety of alkalies and salts is held in solution and much of it is carried to the sea. It is the carbonate of lime obtained by the action of the water on the land that supplies the materials used by sea animals in the construction of their shells. This river load is therefore important in making possible the coral reefs of the present and the beds of limestone formed in ancient geological time. Since the river water carries small quantities of salt to the sea, and since it must be left behind when vapor rises into the air from the water surface, it seems probable that the saltness of the sea is due to this action of rivers. The mechanical burden of the stream is partly suspended in the river water, though immense quantities are pushed along the bottom in the form of fine silt, sand, gravel, and stones, according to the velocity of the water. Some of this is temporarily lodged in the quieter portions of the stream, and, as we have seen, on the flood plains and deltas; but since it is journeying toward the sea, much of it eventually reaches that goal, and there it is accumulated, often after being worked over and distributed by waves, tides, and currents. It is from this source that the sedimentary rocks which form so large a portion of the continents were once derived by the wearing down of ancient lands, the transportation of ancient rivers, and deposition in the early seas.

From these facts it is evident that the work of rivers must be of great importance in the change of the form of the land. They are operating now and have been working through such long periods of past time that their results have been tremendous. It is estimated that 8,370,000 tons of mineral matter in solution are every year removed by running water from the surface of England and Wales. At this rate the surface of the country would be lowered one foot in 12,978 years as a result of solution alone. The Mississippi River carries in suspension or by dragging sediment to the amount of $\frac{1}{1500}$ of the total weight of the water. The river annually carries into the sea a quantity of mud which would make a prism 268 feet in height with a base of one square mile. About 150,000,000 tons of dissolved mineral matter is also annually carried into the sea through the Missisippi. See EROSION.

In the course of this vast denudation rivers are subjected to many changes, some of them of an accidental kind, such as those described above as due to glaciation, etc., others due to their normal development. Among the latter changes the most important is that group which results from the changes of divides. There is a battle in progress between the headwaters of opposing streams. The one that has the most rapid slope to the sea, or the greatest rainfall, or the softest rock to excavate, has an advantage over a less favorably situated opponent. It will push the divide back in consequence. Most often this is accomplished by a very slow backward eating, but occasionally a successful stream taps a large headwater of an opposing system and bodily leads it into its own drainage system. Such rivers have been called river pirates. It has apparently been by such headwater changes that the rivers which now cross the Appalachians through watergaps, like the Delaware, Susquehanna, and Potomac, have eaten their way back to the westward side of this mountain system.

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RIVER BRETHREN, THE. The name applied to a group of Christian bodies supposed to be of Mennonite origin. They originated in a colony of Swiss who settled near the Susquehanna River in eastern Pennsylvania in 1750. During the revival of 1770 congregations were formed among the converts, with Jacob Engle as their first pastor. In many points of their faith and practice the River Brethren resemble the Mennonites and in part also the Dunkards. They baptize by trine immersion; observe foot-washing as a religious rite; use the kiss of greeting between persons of the same sex; teach non-resistance and non-conformity to the world; inculcate plainness in dress and living; abstain from political activity, although they do not neglect the regular duties of good citizens; are strict in the observance of the Sabbath; and endeavor to order their lives according to the precepts of the Bible. Three branches of the River Brethren are recognized: (1) *The Brethren in Christ*, the largest and having the most complete organization, with district conferences and a General Conference which meets annually. They are most numerous in Pennsylvania, Kansas, and Ohio,

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and have churches also in Illinois, Indiana, Iowa, Michigan, New York, and Canada. According to the statistics compiled for the *Church Directory* of 1902, they have in the United States 124 ministers and 2866 communicants. *The Evangelical Visitor*, semi-monthly (Harrisburg, Pa.), is the periodical organ of this Church. The Brethren have missions in Buluwayo and the Transvaal, South Africa; the Baukuna district, Bengal, and the Poona district, India; in all of which 15 missionaries are engaged; and two missionaries at Hidalgo, Texas. (2) *The Old Order of Yorker Brethren* was constituted of churches which, on a division taking place in 1862, adhered to the original doctrine and practice. Most of these churches were in York County, Pa., whence the name 'Old Yorker.' Other churches are in Ohio, Indiana, and Iowa. (3) *The United Zion's Children* originated in a division which occurred in Dauphin County, Pa., in 1853. Retaining the old confession of the Brethren unchanged, they differ from the other branches in certain matters of administrative and formal detail. Their churches are all in the State of Pennsylvania. Their name is supposed to have been given to the River Brethren because they baptized their first converts in the Susquehanna River.

RIVER-CRAB. A crab of the genus Thelphusa, inhabiting fresh water, and having the carapace quadrilateral, the antennæ very short. One species (*Thelphusa depressa*), the 'grancio' of the Italians, is very common in the south of Europe, around the Mediterranean Sea. Other species are common in Palestine and other warm countries.

RIV'ERHEAD. The county-seat of Suffolk County, N. Y., 70 miles east of New York City, on Great Peconic Bay, and on the Long Island Railroad (Map: New York, H 5). It is in an agricultural region and manufactures woolens, paper, carriages, soap, and lumber products. Population, in 1900, 4503.

RIVER RAISIN, MASSACRE OF. See FRENCHTOWN.

RIVERS, NAVIGABLE AND NON-NAVIGABLE. In law a distinction is made between the rights of the public in rivers which are deemed navigable and those which are deemed non-navigable. All navigable waters are subject to the public right of navigation and under certain circumstances to other valuable rights, but the public has no right in non-navigable rivers, they being generally subject to private ownership of the riparian owners. See RIPARIAN RIGHTS; WATERCOURSES.

At common law all rivers in which the tide rose and fell were deemed to be navigable, and therefore subject to the public right of navigation. Owing to the difference in physical character of the rivers in the United States from those of Great Britain, the rule of the civil law has been applied in the United States, and all rivers are deemed to be navigable which are in fact navigable and which afford a channel for valuable commerce. To constitute a river navigable in the legal sense, the commerce carried upon it must be essentially valuable in character and the river must be a natural watercourse, not one constructed by artificial means. *Public rivers* are those which are deemed to belong exclusively to the public. The rights of the public in rivers of this class are substantially the same as the rights of the public in the sea, namely, the right of navigation, fishing, bathing, and the right to take sand and seaweed, water and ice. Within this class are comprised generally all tidal rivers, and in many States all rivers having natural capacity for navigation or flotage. As *semi-public rivers* may be classed all non-tidal rivers which are in fact navigable, which are deemed to be subject to private ownership—which ownership, however, is subject to the public easement of navigation. The riparian owners are deemed to be owners of the bed of the stream *ad filum aquæ;* but their ownership is subject to the public right to navigate the river, and in some States to other similar public easements. Navigable rivers not tidal are deemed to be semi-public in Connecticut, Delaware, Georgia, Illinois, Kentucky, Massachusetts, Maryland, Montana, New Hampshire, New Jersey, New York, North Carolina, Ohio, Rhode Island, South Carolina, Vermont, and Wisconsin.

While all public rivers are subject to the right of navigation, the right extends only to the use of the rivers for purposes of navigation up to the normal high-water mark. The right to navigate does not include a public easement to use the shores of the river for towage or wharfage, although such use may be incidental to navigation. Rivers within or flowing through a State are subject to the legislative control of that State. This right, however, is subject to the power of Congress to regulate commerce, and any legislative act inconsistent with the acts of Congress for the purpose of regulating commerce is void. In case of rivers running between two States, both States have jurisdiction over them. In the United States, by the Constitution and acts of Congress, the admiralty jurisdiction of the United States District Courts extends over all navigable rivers which are used, or capable of being used, as highways of commerce and by themselves, or by connecting bodies of water, form a continuous navigable waterway between States or from a State to a foreign country. Consult: Hunt, *The Law of Boundaries and Fences* (4th ed., London, 1896); Coulson and Forbes, *The Law Relating to Waters* (2d ed., London, 1892); Gould, *The Law of Waters* (3d ed., Chicago, 1900). See ADMIRALTY; MARITIME LAW; WATERCOURSE; BRIDGES, THE LAW RELATING TO.

RIV'ERS. A title borne by three Englishmen prominent in the fifteenth century. RICHARD WOODVILLE, the first Earl Rivers (?—1442), was a favorite of Henry V. The King appointed him seneschal of Normandy; afterwards he was chamberlain to the Regent Bedford and lieutenant of Calais. His son RICHARD (?—1469) married Jacquetta of Luxemburg, the widowed Duchess of Bedford, about 1436. He was a famous fighter, and was created Baron Rivers in 1448. His politics were Lancastrian until 1461, when he joined the York side and acquired great influence by the marriage of his daughter Elizabeth to King Edward IV. in 1464. He was made Constable of England in 1467. In his efforts to overthrow the Nevilles of Warwick, who represented the old nobility, he and one of his sons were captured and executed at Northampton in 1469. His son ANTHONY, second Earl Rivers (c.1442-83), known as Baron Scales during his father's lifetime, shared all King Edward's diversities of fortune, and remained his trusted friend after his return to power. At the

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King's death, Gloucester, afterwards Richard III., became Protector of the kingdom. Actuated by desire to get possession of the person of the young King Edward V., Gloucester arrested Rivers, who was governor of the prince, and he was beheaded on a charge of treasonable designs.

RIVERSIDE. The county-seat of Riverside County, Cal., 65 miles east by south of Los Angeles; on the Santa Ana River, and on the Southern Pacific, the Atchison, Topeka and Santa Fe and the San Pedro, Los Angeles and Salt Lake railroads (Map: California, E 5). It is noted for its beautiful streets and surroundings. Magnolia and Victoria avenues in particular are lined with magnificent shade trees and extend for several miles through orange groves. The city has a handsome court house and a public library. Riverside is the centre of one of the richest orange-growing sections in the world, and lemons also are extensively cultivated. The first settlement was made in 1870 and the city was incorporated in 1883. Population, in 1900, 7973.

RIVES, rēv, ALFRED LANDON (1830-1903). An American engineer, son of William Cabell Rives, United States Minister to France, born in Paris. He studied at the Virginia Military Institute and the University of Virginia, and in 1854 graduated at the Paris Ecole des Ponts et Chaussées. He was assistant engineer on the Capitol building in Washington, worked on the Washington aqueduct and on governmental improvements of the Potomac River, and in the Civil War became colonel of engineers in the Confederate army. Then he became an engineer of the Chesapeake and Ohio Railroad, vice-president and general manager of the Mobile and Ohio Railroad, and afterwards of the Richmond and Danville Railroad, and, after acting as superintendent of the Panama Railroad, was chief engineer of the Cape Cod Canal. His daughter is the Princess Troubetzkoy (Amélie Rives).

RIVES, AMÉLIE, Princess Troubetzkoy (1863—). An American author, born in Richmond, Va. She early began to write stories, some of which were published in the *Atlantic Monthly*. Her first collection of tales, published in 1888, was called *A Brother to Dragons, and Other Old-Time Stories*. This was followed by *Virginia of Virginia* (1888), and *The Witness of the Sun* (1889). In 1889 she created a marked sensation by *The Quick or the Dead*, and in the same year published *Herod and Mariamne, a Drama*, in verse. Among her later works are: *According to St. John* (1891), a novel; *Barbara Dering* (1892); *Athelwold* (1893); and *Tanis, The Sand-Digger* (1893). In 1888 Miss Rives married John Armstrong Chanler of New York, from whom she was subsequently divorced. She then became the wife of Prince Pierre Troubetzkoy of Russia, and lives in Virginia.

RIVES, WILLIAM CABELL (1793-1868). An American political leader and diplomat, born in Nelson County, Va. He was educated at Hampden-Sidney and William and Mary colleges, and was admitted to the bar. He early became one of the prominent Democrats of Virginia, was a member of the State Constitutional Convention in 1816, of the State Legislature in 1817-19 and in 1822, and of Congress from 1823 to 1829. He was Minister to France from 1829 to 1832, when he was elected to the United States Senate, from which he resigned in 1834. He was reëlected in 1835, and remained in the Senate until 1845. He was again Minister to France from 1849 to 1853, and was a member of the Peace Conference at Washington in 1861, and afterwards of the Confederate Provisional Congress and of the first and second regular Confederate Congresses. He published an excellent *History of the Life and Times of James Madison* (3 vols., 1859-68); *The Life and Character of John Hampden* (1845); and *Ethics of Christianity* (1855).

RIVET (OF. *rivet, rivect*, from OF., Fr. *river*, to clench, from Icel. *rifa*, to stitch together). A metal pin for connecting two plates of metal in boiler and tank making, iron shipbuilding, and steel bridge and structural work. To use the rivet it is heated, inserted in the punch or drill holes of the two plates, and the projecting unheaded end hammered to a hemispherical head. The heading process may be performed by hand or by pneumatic percussive riveting machines, or by squeezing the rivets between the dies of pneumatic, steam, or hydraulic riveting machines. (See METAL-WORKING MACHINERY and PNEUMATIC TOOLS.) Small steel rivets are often headed when cold, and copper rivets and rivets of the other soft metals are never heated.

RIVETING MACHINES. See METAL-WORKING MACHINERY.

RIVIERA, rē'vē-ā'rä. The popular designation of the narrow but beautiful coast line of Italy and France, mainly around the Gulf of Genoa. The eastern half of the Riviera—Riviera di Levante—extends from Spezia to Genoa; the western half—Riviera di Ponente—from Genoa to Nice in France, or as far as Hyères. The Riviera is distinguished by its magnificent scenery, and by its mild climate, which each winter attracts thousands of sojourners of all classes, more especially to the numerous famous resorts along the western coast—Cannes, Nice, Mentone, Monte Carlo, San Remo, etc. The scenery is rather more bold and wildly picturesque on the east coast, and the vegetation is not so rich and attractive there as along the Ponente. Along the western Riviera from Nice to Genoa winds the celebrated Corniche road. The Riviera is occasionally visited by earthquakes, the last having been in 1887. Consult: Lenthéric, *The Riviera, Ancient and Modern* (trans., London, 1895); Hare, *The Rivieras* (ib., 1897); Hörstel, "Die Riviera," in *Land und Leute*, vol. xi. (Bielefeld, 1902); Macmillan, *The Riviera* (London, 1886).

RIVIÈRE, rē'vyâr', BRITON (1840—). An English animal and figure painter, born in London. He was the son and pupil of William Rivière (1806-76), one of the family of artists who taught drawing at Cheltenham and Oxford. Young Rivière first exhibited at the Academy in 1858, and his early work was influenced by the Pre-Raphaelites. Afterwards he graduated at Oxford (1867). He was elected a member of the Royal Academy in 1881. The combined animal and figure subjects of Rivière attracted attention, but his "Circe" (1871) and "Daniel" (1872) were the first of his notable large paintings. These were followed by "Persepolis" (1878, his masterpiece), "In Manus Tuas Domine" (1879), "A Mighty Hunter Before the Lord" (1891), "Beyond Man's Footsteps" (1894, in the National Gallery), and "To the Hills" (1901).

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He has been called the greatest English animal painter since Landseer.

RIVIÈRE DU LOUP, rē'vyâr' dụ lōō (EN BAS). A town in Canada. See FRASERVILLE.

RIVIÈRE DU LOUP (EN HAUT). A town in Canada. See LOUISEVILLE.

RIVIÈRES DU SUD, dụ sụd. A French colonial possession in Africa. See FRENCH GUINEA.

RIVINGTON, JAMES (c.1724-1802). A noted Tory journalist of New York in the Revolution. Rivington early acquired wealth as a bookseller in his birthplace, London, lost it at Newmarket, emigrated to Philadelphia (1760), and thence to New York (1761), where he had a bookshop in Wall Street. In 1773 he began to publish *The New York Gazetteer, or the Connecticut, New Jersey, Hudson River, and Quebec Weekly Advertiser*, bitterly attacking the Revolutionary movement and its leaders till Captain Isaac Sears, of the Sons of Liberty, came (1775) from Connecticut to New York with 75 horsemen, destroyed Rivington's press, and cast his type into bullets. After a Congressional investigation Rivington was permitted to return to his house, but he thought it wise to visit England, where he was appointed King's printer for New York, and returned thither in 1777 to publish *Rivington's New York Loyal Gazette*, a title presently changed to *Royal Gazette*. About 1781 Rivington turned spy for Washington, and on the evacuation of New York changed the title of his paper to *Rivington's New York Gazette and Universal Advertiser*, but he had lost public confidence. His paper ceased to exist in 1783 and his declining years were passed in obscure poverty.

RIVOLI, rē'vô-lê. A village in Italy, in the Province of Verona, on the river Etsch, 13 miles northwest of Verona, noted as the scene of a victory gained by Napoleon over the Austrians under Alvinczy, January 14-15, 1797. His services in the battle gave Massena (q.v.) the title of Duke of Rivoli (1807).

RIVOLI, rē'vô'lē', RUE DE. One of the most noted streets of Paris, running from the Place de la Concorde to the Rue Saint Antoine. The western end of the street contains many of the most attractive shops of the city, and is lined on the north side with arcades for several blocks, facing the Louvre and the Tuileries Gardens. It was begun in 1802, was completed in 1865 at a large cost, and received its name in honor of Napoleon's victory at Rivoli in 1797.

RIX, JULIAN WALBRIDGE (1850-1903). An American landscape painter, born at Peacham, Vt. He began to paint landscapes in 1875, and was self-taught, studying directly from nature. His subjects are chosen from all parts of America and his treatment has in every case been remarkable for variety. No two paintings from his brush represent the same viewpoint, and he is noticeably free from mannerism. One of his most characteristic pictures is "St. John Harbor" (1903), a marine, which shows fine cloud and sky effects. Other works, all in private collections in Baltimore, New York, Rochester, and South Bethlehem, Pa., include, "Sunset, California Coast," "High Tide, Coast of Maine," "The Woodland Spring, Mike Marr's Camp, Moosehead, Maine," "Breezy Afternoon," "Solitude," "Old Oaks," "Twin Oaks," "Noonday," and "A Breezy Day."

RIYAD, rē-äd'. A town of Arabia. See RIAD.

RIZAL, rē-thäl'. A province of Central Luzon, Philippine Islands (Map: Luzon, F 8). It was formed in 1901 by the consolidation of the former provinces of Manila and Mórong (the city of Manila being excluded as a separate municipality), and lies north of Laguna de Bay and east of Manila Bay. Its area is 1048 square miles. The northern part is mountainous and covered with forests; the southern portions are low and alluvial, and subject to destructive floods from the Laguna. The province is traversed by the Pásig River. The chief agricultural product is the betel, but rice, sugar, corn, and tobacco are also raised. The estimated population in 1901 was 246,940, almost wholly Tagálog. The capital is Pásig (q.v.).

RIZAL, JOSÉ (1861-96). A Filipino patriot and writer. He was born at the pueblo of Calamba, Province of Laguna, Luzon, of Tagálog parentage; studied under the Jesuits at Manila; went to Madrid in 1882 for the purpose of studying medicine; received the degree of doctor of medicine and philosophy at the university there, and subsequently studied in Paris, Heidelberg, Leipzig, and Berlin, devoting his attention particularly to surgery, ethnology, linguistics, and philology. He acquired a more or less extensive knowledge of seven languages, became markedly proficient in optical surgery, and made a careful study of the history, institutions, and customs of various European countries. He early came to realize the disadvantages under which his race labored in the Philippines and the oppression to which it was subjected, and in 1886 published, in Spanish, a novel, *Noli me Tangere*, in which he exposed and denounced the Spanish administration of the islands and in particular gave a startling picture of the alleged bigotry, rapacity, and cruelty of the religious Orders. This book aroused the animosity of the Spanish officials, by whom Rizal was virtually forced to leave the islands within a few months after his return in 1887. Rizal then spent some time in Japan, London, and on the Continent of Europe, and in 1891 published *El filibusterismo*, a sequel to *Noli me Tangere*. Besides endeavoring to further the cause of his people by his writings, he was instrumental in organizing the "Liga Filipina," which has for its object the expulsion of the friars, the securing of the liberty of association and of the liberty of the press, and the obtaining of political concessions similar to those which have been granted to Cuba. The Government in Luzon had rigidly prohibited the circulation of any of Rizal's writings, but in 1892 he ventured to return to Manila under a virtual promise from the Governor-General that he should be allowed to live there in safety. Upon his arrival, however, he was almost immediately arrested, was nominally convicted of having helped to organize the secret and revolutionary society known as the Katipunan, and was banished to Dapitan, Mindanao. In 1896 he volunteered to act as a physician in Cuba, where a violent epidemic of yellow fever was raging; but was seized while on his way, was brought back to Manila, and there, after a mock trial, was shot, December 30, 1896, as a traitor. His in-

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fluence among the Filipinos was enormous, and his abilities were such that he has been ranked by some writers as, in many respects, perhaps the ablest man the Malay race has produced. The novel *Noli me Tangere* was translated into English by Gannett as *Friars and Filipinos* and published in New York in 1900. Consult: Blumentritt, *Biography of Dr. José Rizal* (Eng. translation, Singapore, 1898); Clifford, "The Story of José Rizal, the Filipino," in *Blackwood's Magazine*, vol. clxxii. (Edinburgh, 1902); and, for an attempted justification of the Spanish officials, *La masonización de Filipinas: Rizal y su obra* (Barcelona, 1897).

RIZÄUS, rē-tsä'us. The real name of the Dutch theologian usually called Albert Hardenberg (q.v.).

RIZEH, rē-zē'. A port in the Vilayet of Trebizond, Asiatic Turkey, situated 40 miles east of Trebizond (Map: Turkey in Asia, J 2). It is now known chiefly for its healthful climate and picturesque surroundings, which make it popular as a summer resort. It manufactures scarfs and linen cloths. Population, about 2500.

RIZZI, rēt'sē, ANTONIO (c.1430-c.1497). An Italian sculptor, born in Verona. He was probably the son and pupil of Pietro Rizzi, with whom he worked on the monument of the Doge Francesco Foscari (1457) in the Church of the Frari, Venice. The statues of Adam and Eve (c.1471) on the grand stairway of the Doge's palace are remarkable for their lifelike attitudes. Rizzi was plainly influenced by the Renaissance movement in his great monument to the Doge Niccolò Tron (1479-76) in the Frari, an elaborate work with many life-size figures, medallions, and reliefs. Rizzi was the engineer of the Republic in the war against the Turks (1483-1490) and was afterwards principal architect, and rebuilt a portion of the Doge's palace which had been destroyed by fire.

RIZZIO, rēt'sē-ō, or **RICCIO**, DAVID (c.1533-66). A favorite of Mary Stuart, Queen of Scots. He was born near Turin, Italy, and came to Scotland in an embassy sent by the Duke of Savoy. As he possessed a good voice, the Queen selected him for the quartet in her private chapel. He rapidly rose in favor, and in time became her secretary and chief counselor, but there is no proof that his relations with Mary were ever of a criminal nature or that he was a Papal agent. Rizzio's haughty demeanour aroused the nobles and they made use of the jealousy of Darnley, Mary's husband, to form a conspiracy for the purpose of killing the hated foreigner. The moving spirit of the affair was probably William Maitland of Lethington, whom Rizzio had practically superseded as Secretary of State in 1565. The Protestant leaders were also glad to get rid of the Catholic favorite. On Saturday evening, March 9, 1566, the conspirators broke into Mary's chamber in Holyrood Palace, Edinburgh, dragged out Rizzo, and murdered him. The Queen afterwards, when she regained power, caused Rizzio to be buried with great honors. Consult Ruthven, *Narrative of Riccio's Murder* (Edinburgh, 1836). See MARY STUART.

ROACH (OF. *roche, rosse*, Fr. *roche*, from MDutch *roch*, LGer. *ruche*, Ger. *Roche*, AS. *rochche*, Lat. *raja*, roach, ray). A small cyprinoid fish (*Leuciscus rutilus*) plentiful in the lakes and streams of Northern Europe, and similar to the bream (q.v.). It may exceed a foot in length. The upper parts are clear green, with blue reflections, the lower parts silvery white, and the fins reddish. It often gathers into large schools and is an angler's fish, but not much esteemed for the table. An American minnow, the golden shiner (*Abramis chrysoleucus*), is sometimes called roach. See Plate of DACE AND MINNOWS.

ROACH, JOHN (1815-87). An American shipbuilder, born at Mitchelltown, County Cork, Ireland. When fourteen years of age, he emigrated to America. After working in the Howell Iron Works in New Jersey, he, with two fellow workmen, established a foundry near New York. Soon afterwards he bought out his partners, and in 1868 bought the Morgan Iron Works. Four years later he bought the Rainer shipyards at Chester, Pa., and soon became known as one of the foremost of American shipbuilders. Among the 114 iron ships constructed at his yards were several war vessels, including the *Chicago*, the *Atlanta*, the *Boston*, and the *Dolphin*. The rejection of this last vessel by the Government in 1885 led him to make an assignment. The shipyards were soon reopened, however, under the management of his son, John B. Roach.

ROAD (AS. *rād*, from *ridan*, OHG. *ritan*, Ger. *reiten*, to ride; connected with OIr. *riad*, ride, Gall. *reda*, wagon). A way of communication by land between two or more points, generally for vehicular traffic. Roads have developed with commerce and travel, and particularly with war, conquest, and military control of distant countries. Strabo mentions three great highways running out from ancient Babylon. The earliest systematic roadmaking is credited to the Carthaginians, but the great road-builders of olden times were the Romans. The Appian Way (q.v.), begun by Appius Claudius, B.C. 312, appears to have been the earliest notable piece of permanent road work. In general Roman roads were built in straight lines, regardless of ordinary grades, and were paved to a great depth, the several layers of stone and concrete sometimes aggregating three feet in thickness.

One of the earliest English road laws was passed by Parliament in 1285. It directed that all trees and shrubs be cut down to the distance of 200 feet on either side of roads between market towns, to prevent the concealment of robbers in them. The first toll for the repair of roads was levied by the authority of Edward III., in 1346, on roads which now form part of the streets of London. In 1555 an act was passed requiring each parish to select two surveyors of highways to keep them in repair by compulsory labor; at a later period, in place of the compulsory labor, the 'statute labor tax' was substituted.

In France, Louis XII. ordered an inspection of and report on the roads of the kingdom in 1508, while late in the same century Henry IV. appointed the 'Great Waywarden of France.' In 1556 a stone road 15 feet wide was built from Paris to Orleans, with about 20 feet of unpaved public way on each side. France appears to have been the leader in modern road construction, but it was soon surpassed by England, and gave up its own for the English macadam system of road improvements. By 1775 Tresaguet had evolved

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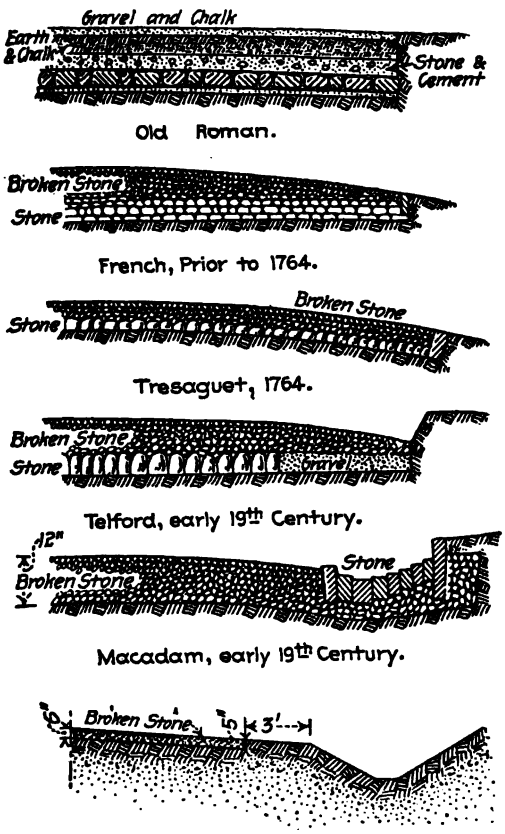
a system of improved road construction in many respects similar to that now widely used throughout the world. First of all, Tresaguet prepared a curved bed, or earth foundation, for his stonework, parallel with and about 10 inches below the finished surface of the proposed roadway. Instead of laying his large stones flat he set them on edge, broke their upper edges off to an even surface, then covered this stone foundation with another hand-laid course of stone, smaller than the first, and with its edges also hammered off. Finally, he put on a third layer of stones, broken to about the size of an English walnut, and spread by a shovel. The hardest stone was chosen for the surface layer. This general system was continued in France until 1820. In that year the plan worked out by Macadam in England was introduced in France, and in 1830 it was officially adopted in the latter country. It involved comparatively little change except in the foundation, as will be seen from the description of Macadam's work, further on.

Macadam and Telford (qq.v.), whose names have been applied to the two rival systems of broken-



THE DEVELOPMENT OF BROKEN STONE ROADWAYS.

stone road construction now practiced for nearly a century, were both Scotchmen, born within a year of each other (1756 and 1757, respectively). Although both of these great engineers built hundreds of miles of broken-stone road construction on modifications of the French plans already described, Macadam departed further from his models. Telford retained the single course of large stone on edge, introduced in France by Tresaguet, but he placed them on the bed of a level trench, and secured a curved surface to his roadway by using larger, or taller, stones at the centre than at the sides. Over these large stones, in some cases, he spread a layer of gravel 1 inch deep; then he finished the roadway with about 6 inches of broken stone. Macadam used nothing but broken stone from the finished surface of the earth foundation, at the same time raising the stone bed above the earth at each side, instead of sinking it in a trench. The latter change was designed to facilitate drainage. Macadam's entire system was founded on perfect drainage and on the thorough compacting of the angular fragments of broken stone into one solid mass. See ROAD AND STREET MACHINERY.

Prior to 1800 there were few roads in the United States that deserved to be characterized as improved. In 1796 Francis Baily, in his *Journal of a Tour in Unsettled Parts of North America*, wrote that "there is at present but one turnpike road on the continent, which is between Lancaster and Philadelphia, a distance of sixty-six miles, and is a masterpiece of its kind; it is paved with stone the whole way, and overlaid with gravel, so that it is never obstructed during the most severe season." The road was built by a company, chartered in 1792. At the start it consisted of boulders rolled in helter skelter and filled between and above with earth and gravel. Heavy rains reduced the road to a dangerous condition. It is said that the road was afterwards macadamized. This was only one of many toll roads, distributed over the United States, but it is doubtful whether any of the other early ones could lay claim to having been macadamized. Another toll road, built in whole or in part before 1800, extended from the Shenandoah Valley, in Virginia, westward to Kentucky. It was built, and as late as 1895 it was said still to be owned by the Wilderness Turnpike Company. Although many attempts were made to secure road construction by the National Government in the early days of the Constitution, the only such work of importance, if not the sole example, was the National Road (see CUMBERLAND ROAD) from Cumberland, Md., westerly 800 miles to Vandalia, Ill. The original plan was to build a road from the Atlantic coast to the Ohio River. The road had a total width of 80 feet, and was macadamized to a width of 30 feet. As settlement proceeded, *corduroy*, or log-surfaced roads, were built across dangerously wet and soft stretches, and with the advent of the saw mill, *plank roads*, particularly for the toll ways, became common in some sections. When new, or when kept in good repair, plank roads were a vast improvement, but they were expensive to maintain and liable to get badly out of order.

After the wave of internal improvements had swept over the various States of the Union, or from, say, 1835-40, on, road construction generally became a purely local matter, except where turnpike companies built long stretches of toll roads. The advent of railways rapidly lessened the demand for extensive single lines of highways. "Working out the road tax," instead of paying the tax in money and having the money laid out by experienced road-builders, was the rule, and poor roads were the result. The rapid

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increase in urban population, in general prosperity, and in municipal improvements, which followed the Civil War, was largely responsible for the beginning of improved city streets. These led to better roads, and from better roads it was only a step to the agitation for good roads that assumed such great proportions in the United States from about 1890 onward. This, in turn, was largely due to the widespread use of the bicycle. Prior to the general movements for good roads some towns in Essex County, N. J., began to improve their streets. In 1868 Orange, N. J., laid a 16-inch Telford road and in 1871 Essex County, in which Orange is situated, began the construction of an improved system of country roads.

Road Laws—Development of Good Roads. In 1889 a general county road law was passed by the New Jersey Legislature. This permitted counties, after certain legal formalities, to issue bonds for broken stone or hard road construction and to assess one-third of the cost upon property abutting on the line of the road. In 1891 New Jersey passed a State Aid or State Highway law, which was the beginning of systematic road improvement in the United States under the direction of State officials and with the aid of State funds. The law being defective, it was reënacted in 1892, and on December 27 of that year the State of New Jersey paid $20,662 to Middlesex County to help meet the cost of 10.55 miles of broken-stone roads. This was the first money paid by the State under the amended act, and the first direct State aid to the good roads movement. Most of this work was done in the vicinity of New Brunswick and Plainfield. At first the commonwealth was represented by the president of the State Board of Agriculture, but after May, 1894, the work was entrusted to an official known as the State Commissioner of Public Roads. Under the act the cost of road construction is divided as follows: The State pays 33.3 per cent., abutting property-owners 10 per cent., and the counties in which the improvements are located pay the remainder. The initiative rests with the owners of property abutting on the road in question, two-thirds of whom must petition the County Freeholders for the improvement. That body carries out the work, under the direction of the County Engineer and subject to the approval of the State Commission. In 1899 the act was amended so that petitions may be filed with and work done by townships, as well as by counties. To the close of October 31, 1900, the total mileage of roads built under the New Jersey State Aid Law was 532 and the State's contribution (one-third of the total cost) had been $865,319, or about $1600 per mile. The State appropriations have ranged from $75,000 to $150,000 a year—in 1899. Some of the money was spent for general roads, but most of it was put into broken-stone roads.

The example set by New Jersey has been followed by several other States, notably Massachusetts. In fact, Massachusetts is now in many respects the leader in the movement for highway improvements under intelligent State direction, aided by State funds. Its Legislature appointed a committee to investigate the subject in 1892, or the next year after the first New Jersey State Road Act, and in 1893 it established a State Highway Commission of three members. Appropriations for actual construction were not made until 1894. To the close of 1900 a total of 296 miles of State highways had been improved under the Massachusetts Act of 1893, and the State had appropriated more than $3,500,000 for the work. Of this sum one-fourth was to be repaid to the State, with interest at 3 per cent., and within at least six years. The counties were to collect the one-fourth by taxation. In 1900 Massachusetts appropriated $500,000 for State roads (one-fourth to be repaid to it eventually), and in addition it provided $6,000 for the salaries of the three commissioners, $17,060 for engineers and clerks, and $5,440 for traveling expenses and incidentals, making a total of $28,500 for salaries, engineering, and the like, besides the $500,000 for construction. In 1899 it appropriated a like sum and in 1898 half the amount, making $71,300 in addition to the $3,500,000 already named. Prior to the special appropriations the various expenses of the commission came out of the construction fund. The popularity of the plan in Massachusetts is shown by the fact that to the close of 1900 274 towns and 25 cities had petitioned for a total of 1,334 miles of improved roads, or more than four times as much as the commission had been able to build. Beginning with 1900 the cost of repairs, up to $50 a mile in each year, is to be assessed on the towns in which the road is located. The Massachusetts Legislature of 1900 made provision for an expenditure of 5 per cent. of its total appropriation, or $20,000 in that year, for grading and minor improvements in small towns which had not yet received State aid. During the year 1900 the average cost of a standard mile of macadamized road was $8,957. This is for a width of 15 feet of stone, a depth generally of 6 inches, and a shoulder 3 feet wide on each side. It also includes painted guard rails at all steep embankments, and culverts of masonry, iron, or vitrified clay, wherever needed. It should be understood that the improvements are all on existing roads and do not include acquiring land or laying out and grading new roadways.

Rhode Island, Connecticut, and New York have also tried the State road aid plan. Rhode Island repealed its law in 1899. In Connecticut the work began in 1895 and has been growing in popularity ever since. In 1895-96 the expense of improving roads was divided equally between the State and the counties and towns in which the roads were located. In 1897-98 it was divided equally between the State and the various towns. In 1899-1900 the small towns paid one-fourth and the large towns one-third the coast, the State paying the rest. The dividing line between large and small towns is an assessed valuation of $1,000,000. From 1895 to 1900 State aid was given in 159 of the 168 towns of the State, and in 1900 there were applications from 153 towns. The total amount available to the close of 1900, including State and local funds, had been $1,317,550. Connecticut appropriations may be expended, in part, for grading and improving dirt roads.

New York adopted the State aid plan in 1898, but was sparing in its appropriations, and contributed only $250,000 from 1898 to 1900, inclusive. The State pays one-half the cost of road improvements, the rest being divided be-

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tween the county in which the road is located and the abutting property-owners. In case the latter petition for the improvement, they pay 35 per cent. of the total cost; otherwise, only 15 per cent. In 1900 an act was passed requiring towns to keep the State roads in repair, under the direction of the State Engineer. That official passes on all applications for State aid and is in charge of the work. To the close of 1900 New York had built 53½ miles of State road, and surveys and estimates for 404 miles were under way. The State Engineer is empowered to build telford, macadam, gravel, or other kinds of roads.

Vermont appointed a State Highway Commission of three members in 1894, reappointed it in 1896, and in December, 1898, created the office of State Highway Commissioner. The commission of 1892-96 seems to have had no powers or duties save of investigation and advice, but it did some educational work and issued two reports. The Commissioner under the law of 1898 supervises the expenditure of the State road tax and is empowered to provide experts to give instruction in road-making. Other States than those named have made more or less extended inquiries relating to aid in road construction. The work is largely educational, since a vast expenditure would be required to macadamize all the roads of even the smaller States. The plan generally pursued is to improve either highways between important towns, or notoriously bad pieces of road. Often the two are combined.

In mentioning educational work, the Road Inquiry Division of the United States Department of Agriculture should not be overlooked. For several years past much has been done at Washington to collect and disseminate information relating to the benefits of good roads and how they may be best and most cheaply built and maintained. Numerous bulletins on the subject have been issued, and sample stretches of improved roads have been built in different sections, notably in conjunction with the State agricultural experiment stations.

The essentials of good roads are: (1) Proper location; (2) easy grades; (3) a smooth, hard, durable wearing surface. In the case of new roads there is little or no excuse for poor location, and no danger of it if the advice of a good road engineer is sought and followed. Ideal grades should not exceed a rise of 1 foot in 33⅓ of horizontal distance, which is known as a 3 per cent. grade. Telford allowed a rise of 1 in 30, and French engineers permit 1 in 20, but this is for smooth broken-stone roads.

The only classes of wearing surface for improved roads considered in this article are gravel and macadam. (For wood, brick, and stone block and sheet and block asphalt, see PAVEMENT.) Gravel, spread in layers and well rolled, makes a very good road surface, but one that is rather expensive to maintain. Gravel should be screened to free it from earth and to sort out for use the stones ranging from about ¾ to 1½ inches in diameter. The stones should be as angular as possible. A mixture of iron-bearing clay is desirable to bind the gravel together. Smooth beach or river gravel should be avoided, but some or all of it may be crushed and used where nothing else can be found. The lines between the macadam and telford roads are not drawn so hard and fast as they once were. The tendency seems to be to use telford, or a foundation of large stone, where the ground is yielding or the traffic very heavy. The stones are placed by hand, as close together as may be. The projections above the desired depth are broken off with hammers, after which two or more layers of broken stone are spread and rolled, each separately. Whatever the number of layers, the top one is composed of fine screenings, both to fill the interstices in the layer below and to give a smooth surface. The proper sizes for broken stone, and whether or not clay, loamy earth, sand, or some other material to fill the spaces between the stone and help to bind the stone together, should be used is a mooted question. There is much to be said in favor of having the fragments as homogeneous as possible, both in size and hardness, and relying upon the roller so to pack the stone as to leave no voids. Such voids as would be thus left might well be filled as completely as possible with some material. There are obvious advantages in having this done by the smaller sizes of broken stone. Some authorities strongly advocate fine gravel and sand for filling the interstices. Careful sprinkling of the upper layer of stone is essential, but if too much water is used it will penetrate to and soften the earth beneath, thus causing settlement in spots and an irregular surface. The Massachusetts Highway Commission uses screens of ½, 1½, and 2½ inches. Stones between 2½ and 1½ inches in size are placed at the bottom; those between 1½ and ½ inch come next; and the screenings last. Each of the three layers is rolled separately and the last is sprinkled before it is rolled. The best material for broken-stone road surfaces in America is generally considered to be basaltic or trap rock. Some limestones serve the purpose well. Carefully selected field stones, if of a kind that will break into angular pieces, often give good results. In general, any stone used for macadam or telford roads should be tough, fine-grained, and not readily acted upon by acids or the weather.

Good drainage is an essential of all road and street construction. Water falling on the surface is removed by giving the road a proper inclination, both longitudinally and transversely, and conveying it to natural watercourses. Culverts of masonry, vitrified clay, or iron pipe are employed where open channels are impracticable, both to carry the water from the road surface and for natural watercourses beneath the roadway. Where roads pass through wet land, underdrains are necessary to keep the earth dry beneath the road surface. These, also, may be of stone or some kind of pipe, placed in the middle of the road, at the side, or running from the centre to one or both sides, according to local conditions.

Maintenance of roads is no less important than their construction, but this fact is yet to be learned in most parts of America. American engineers know how to build good roads, but can rarely secure the money necessary to maintain them, although money so spent is saved in the end. There are two methods of maintaining broken-stone roads—the constant and the intermittent road-repair system. In the former the roads are divided into sections, each in charge of one or more men. Broken stone is

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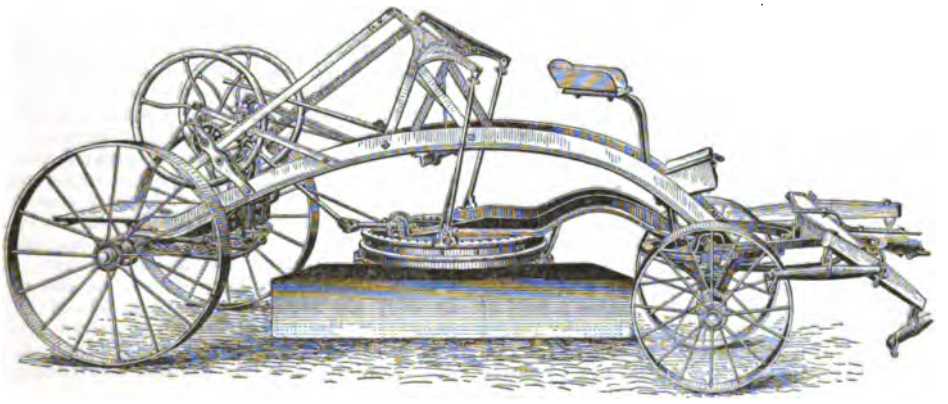
provided at convenient intervals of space and applied to ruts and depressions as rapidly as they occur. In the other method, few repairs are made for a number of years. When the road becomes badly worn a new dressing of stone is applied. There is also an intermediate plan of large patching. Before applying new metaling, as the broken stone is called, the upper portion of the worn roadway is often loosened to a depth of 1 or 2 inches, by means of teeth or other picking devices, attached to road-rollers (see ROAD AND STREET MACHINERY), or by hand. The loosened surface is sprinkled and rolled much the same as in new construction. The dust and mud that inevitably form on macadam roads should be swept or scraped off, as the case may be, and until the dust seems uncontrollable it may be laid by sprinkling. Wide tires for all heavily loaded vehicles lessen the wear of roads; and they are required by law in some sections.

BIBLIOGRAPHY. Consult the authorities named under PAVEMENT, particularly Aiken, Byrne, and Maxwell; also Shaler, *American Highways* (New York, 1896), which, besides being a good and reliable presentation of the subject, is somewhat specific as to the work of the Massachusetts Highway Commission; Rockwell, *Roads and Pavements in France* (New York, 1896), a brief review by an American of the notable system of French road maintenance; Codrington, *Maintenance of Macadamized Roads* (London and New York, 2d ed., 1892), which gives British maintenance practice in detail, but is not up to date; Gillette, *Economics of Road Construction* (New York, 1901), discusses methods and costs of construction; Judson, *City Roads and Pavements* (Oswego, N. Y., 1894); Special Consular Reports on *Streets and Highways in Foreign Countries*, vol. iii. (Washington, D. C., 1891; reprinted in 1897); Roy Stone, *New Roads and Road Legislation in the United States* (New York, 1894); Jenks, *Road Legislation for the American State* (Baltimore, 1889); *Road Inquiry Bulletins* of the United States Department of Agriculture; and reports of the Massachusetts, Connecticut, and New Jersey Highway Commissions, and (from 1898) of the State Engineer of New York, and of the Ontario Provincial Instructor in Roadmaking. See PAVEMENT; ROAD AND STREET MACHINERY; STREET.

ROAD (in law). See HIGHWAY.

ROAD, LAW OF THE. See RULES OF THE ROAD.

ROAD AND STREET MACHINERY. Under this head may be included the various implements, other than hand tools, used in constructing and maintaining roads and streets, with the exception of such apparatus as is peculiar to the construction of asphalt pavements. (See PAVEMENT). Ordinary plows and scrapers for loosening and moving the natural earth surface in the preparation of the roadbed need no extended description. Scrapers of this sort are either *drag* or *wheel*, according to whether their bottoms rest on the surface of the earth when their loads are being moved, or whether the whole scraper is mounted on and conveyed between two wheels. There is another class of scraper, more properly called a *road machine*, which consists of a long inclined blade, generally of steel, mounted diagonally between two pairs of wheels, and capable of vertical adjustment so as to vary its cutting depth and also permit it to conform to the angle of the road surface. These machines are drawn by horses and throw the earth from the side toward the centre of the road. Another machine used in road construction is known as a *grader*, or *grader and ditcher*. It loosens the earth by means of a plow mounted between two sets of wheels, lifts it on to a converging belt, and dumps it into the roadway, the waste banks at the side, or into a wagon for removal to some more distant point.



ROAD MACHINE.

ROAD ROLLERS are largely used to compact roads formed by embankments; to solidify roadbeds whether in cut or fill, in order to give as unyielding a foundation as possible to surfacing of more durable material; and finally for compressing broken stone or asphalt and for bringing the various classes of block pavements to a firm bed and regular surface. The steam rollers are equipped with boilers and driving engines; the horse rollers consist of little but the rollers themselves. The rollers proper, in both classes, consist of one or more revolving hollow iron cylinders, resembling very broad wheels, mounted on an axis. The axis is attached to the front end of the driving engine or, in the case of horse rollers, a frame supporting a seat is mounted on the axis and over the roller and a pole and whiffletree are attached to the front of the frame. The weight of rollers ranges from 2½ to 20 tons, steam rollers being the heaviest.

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STONE OR ROCK CRUSHERS are used to break stone into small sizes for macadam or the upper portion of telford roads and for use in preparing concrete. (See GRINDING AND CRUSHING MACHINERY.) *Screens* are for separating broken stone into various sizes. (See ORE-DRESSING.) Further operations connected with getting out stone for road work are treated under QUARRYING. *Stone-spreaders* are used to distribute broken stone in layers of regular thickness on road surfaces. The machine consists of a wagon, on which is mounted a box whose forward end may be raised to give the bottom any desired slope, and of a trailing box reaching to the ground, having a scraper attached to its bottom and rear. By adjusting this scraper the depth of the stone may be regulated at will.

SPRINKLERS are used to moisten earth and stone used in road construction, and to lay the dust on completed streets. Their most common form is a cylindrical tank, mounted on four wheels, and with the sprinkler proper attached to the rear of the wagon. The sprinkler is a perforated tube, or tubes, adjusted to throw the water out in a spray, or shower, at the rear and sides. Sometimes special street railway cars are equipped with sprinklers, for watering the portion of the streets between and for a little space each side of the tracks. About 1895 a street-car sprinkler was introduced which waters a half of the full width of the street at a time, by means of a swinging arm attached to the side of the car.

SCRAPERS FOR CLEANING STREETS are employed to remove stiff mud from roads and streets, and particularly from broken-stone roads. They consist of a series of steel or iron teeth, or long curved blades 3 to 5 inches wide, attached to a framework in such a manner that they will yield to and pass over irregularities in road and street surfaces without tearing up the stone or other material. They pile up the mud at one side.

STREET SWEEPERS of many types are employed to collect street dust and dirt for removal. Most of them consist of a revolving broom, mounted diagonally beneath and at the rear of a four-wheeled truck. The ordinary sweepers throw the dirt out to one side, in a continuous heap or row. In recent years various *pick-up sweepers* have been invented and to a rather limited extent introduced. Most of them throw the dirt on to a conveyor actuated by the revolutions of the axis of the wagon, and one type picks up the dirt by means of an exhaust fan, driven by an engine mounted on the machine. Nearly all the sweeping machines are drawn by horses, including the one just described, but toward the close of the nineteenth century the introduction of self-propelled sweepers was begun.

SCARIFIERS, for loosening the surface of macadamized roads prior to re-surfacing, are used quite extensively in England. They consist of teeth, tines, or drills, attached to a special machine or to a road roller in such a way as to tear up the surface to a slight depth, by actions similar to plowing, drilling, or hammer blows, according to the machine. In the United States the same end is attained by fastening spikes to steam road-rollers, or by means of specially shaped plows.

The use of broken stone for road surfaces depends very largely upon the development and use of two of the classes of machinery described in this article, road rollers and stone crushers. The first practical road roller was made in France, in 1787, by M. de Cessart, Inspector-General of Bridges and Roads. It was made of cast iron, was three feet in diameter and eight feet wide. In 1817 a road roller was patented in England by Philip H. Clay, and in 1825 another English patent on a road roller was granted to John Biddle. Various writers place the beginnings of the continuous use of road rollers in both France and England during the period 1830-40. Some credit the French engineers with being pioneers in this respect, in 1820. Steam road rollers, which have now largely replaced horse rollers where the use of the former is feasible, were first patented in France early in 1859, by Louis Lemoine, of Bordeaux. A roller weighing ten long tons (22,400 pounds) was immediately built. It was used in Bordeaux, and in 1860 it was also used in Paris. In 1863 W. Clark, of Calcutta, India, and W. F. Batho, of Birmingham, England, patented a steam road roller, and in 1864 a machine built after their patent was shipped from Birmingham to Calcutta. Several other rollers of this type followed in England, the most successful of which, judging from its subsequent wide adoption, was that of Aveling and Porter, of Rochester, England. This firm seems to have combined, in 1865, a road traction engine with rollers, substituting the latter, on very broad wheels, for the ordinary wheels of the engine. In 1867 the same firm made a 30-ton (67,200 pounds) roller for Liverpool, a weight which is now considered excessive. Since 1880 several American steam rollers have been introduced.

The first stone-crushing machine was invented by Eli Whitney Blake (q.v.), of Connecticut, in 1852-57. It was introduced in England in 1860 and has since been used, with or without modifications, all over the world. It was a jaw crusher. Other types of crushers have been introduced since then, but few, if any, have been so extensively used. See GRINDING AND CRUSHING MACHINERY; ORE-DRESSING; PAVEMENTS; QUARRY, QUARRYING; and ROAD. Consult: Byrne, *Highway Construction* (New York and London, 1900); and Aitken, *Roadmaking and Maintenance* (London and Philadelphia, 1900).

ROAD-RUNNER. A curious and interesting ground-cuckoo (*Geococcyx Californianus*) of the Southwestern United States, also called 'chaparral-cock,' 'snake-killer,' and 'paisano.' It is nearly two feet long, of which the tail is about one-half. The plumage is bronzy or coppery green, changing to dark steel blue on the head, everywhere except on the rump streaked with white or tawny; under parts soiled whitish, streaked with black on the throat, breast, and sides. The road-runner is notable for its swiftness of foot, for, aided by its wings, it is said to equal the speed of a horse. It is almost omnivorous, but reptiles and mollusks form a large part of its diet. The nest is a flimsy structure of twigs in a bush, and the white eggs are 6 to 9 in number. Like other cuckoos, the incubation begins as soon as one egg is laid, so that fresh eggs and young birds may be found in the same nest. It is said that road-runners can be domesticated, and then make very interesting pets. Another species (*Geococcyx affinis*) inhabits Southern Mexico and Guatemala. Consult Cooper, *Birds of California* (San Francisco, 1870). See Plate of CUCKOOS.

ROADS AND RAILROADS, MILITARY. Military roads are of two general classes:

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First, those incidental to the advance of civilization and the development of a new country; as, for example, in the case of the many roads constructed by army officers during the development of the western and central portion of the United States, and such as are now being constructed in places in the Philippines. These roads are simply such modifications of ordinary country and macadamized roads as seem best to suit the purposes in hand. Frequently their main object is to keep up a line of communication for the supply of permanent garrisons in time of peace. The second class comprises new roads and repairs to existing roads incident to the active operations of an army. These are sometimes short pieces of road built to furnish communication to and between different parts of camps and fighting lines where they are used for a period extending from several days to months, and sometimes roads necessary for the movement of an army and used perhaps but once. There are many excellent examples of work of this kind by the United States Army in the Civil War. Some of the commanding generals organized pioneer companies in each regiment whose special duty it was to keep the roads and bridges in proper shape for the movement of the army. The work consisted generally in such repairs to existing dirt roads as would make them capable of standing the passage of a large body of troops with its trains. It will readily be seen that in such cases makeshift methods were followed that would not be tolerated under other circumstances. Frequently tolerable results were secured by placing on the roads brush, cornstalks, and similar material which were bound together sufficiently to permit of temporary use, but which eventually probably left the road in as bad if not worse condition than before they were used. A favorite method, where applicable, was to corduroy the road. This was done if timber were accessible by cutting down trees and saplings, laying a line of logs parallel to the axis of the road and covering them with small saplings placed across the road. These were fastened down, and, if time afforded, were smoothed on top or covered with dirt. Many modifications of this method have been used. Instead of saplings, brush is sometimes bound together in bundles and used similarly.

Where sawed timber could be quickly and easily procured, roads have been planked in the same manner. An enormous quantity of this class of work was done by Sherman's army in marching northward from Savannah in the Civil War. It is evident that the method of repair of a road under such circumstances must depend almost entirely on the material at hand. It is usually out of the question to metal, or put stone on the road, as is done in macadamized roads for regular use. Still gravel is sometimes at hand and can be used for the purpose. Where time affords, the roads should always be carefully constructed according to approved methods. (See ROAD.) In view of the temporary character of military roads, greater slopes are permissible than in roads to be used for longer periods. It is usually considered admissible to increase the length of the road from 15 to 25 feet for the purpose of saving a foot of vertical height. Rarely less than 8 feet width should be given. If the road is not made wide enough to permit the passage of vehicles at all points, turnouts for this purpose should be established at convenient intervals.

The longer movements of armies are made by rail or steamboat and in the early stages of war, during the mobilization of the army and the forwarding of its equipment and supplies, the railroad occupies a position of prime importance. In the wars of the future it will, of necessity, play a very important part in all operations, whether offensive or defensive. The objective railroad points are usually the large railroad centres, junctions, etc., the great objective point being the frontier, for throughout Continental Europe railroads are built as much for strategical reasons as for purely commercial purposes, so that their general direction is toward the frontiers, fortified places, magazines, general supply stations, and important points of rendezvous. The military powers of Europe include the personnel of railroads in their national military scheme of defense, so that on the call for mobilization the railroad employee at once becomes a component part of the military forces. So far as possible in a country like the United States, the operation is kept in the hands of the officers and employees of the road. During the Civil War the repairs made to roads by the military authorities became a matter of great importance, so much so that special construction corps were organized for the maintenance of certain pieces of roads. The most important railroads—those known to carry the principal supplies for the Northern Army—were frequently attacked and damaged in many places. Systematic provision was made for the material most likely to be used. The maintenance of the road proper, excepting at bridges, was of course simple. The difficulty experienced with bridges is referred to under the head of BRIDGES AND DOCKS, MILITARY.

ROAN ANTELOPE. One of the largest and finest antelopes of Central Africa (*Hippotragus equinus*), related to the oryx, and called 'bastard gemsbok' by the Boers. It stands more than four and a half feet high at the withers, and varies from bright roan-color to various tints of gray or brown, with the face dark brown, broken by a broad white streak in front of each eye, and a white nose. The horns of the bucks are massive, heavily ringed, and sweep backward in a scimitar-like curve which may measure from 33 to 42 inches. This species, though widely distributed, was never very numerous, nor inclined to gather into large herds. Consult authorities cited under ANTELOPE. See Plate of ANTELOPES.

ROANNE, rō'ăn'. The capital of an arrondissement in the Department of Loire, France, on the left bank of the Loire, which is here navigable, 42 miles northwest of Lyons by rail (Map: France, L 5). Its streets are wide, and its houses handsome. The chief structures are the bridge over the Loire, the public library, and the college buildings. Roanne manufactures muslins, calicoes, and woolen and other fabrics. Ship-building is carried on. It has numerous Gallo-Roman remains. Population, in 1901, 34,901.

ROANOKE, rō'a-nōk'. A river formed in southern Virginia by the union of the Dan and the Staunton, which rise in the Blue Ridge (Map: Virginia, F 5). It flows in a winding southeast course of 250 miles through a fertile and picturesque valley in northeastern North

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Carolina, and empties into Albemarle Sound. Its length, including the Staunton, is 450 miles, and it is navigable for steamers 150 miles to Weldon.

ROANOKE. A city in Roanoke County, Va., 56 miles west of Lynchburg; on the Roanoke River, and on the Norfolk and Western Railroad (Map: Virginia, D 4). It is picturesquely situated in the vicinity of the Blue Ridge Mountains, and has the Virginia College (female), Rebekah Sanitarium, and law and public libraries. Hollins Institute, a large women's college under Baptist control, is six miles distant to the north. Roanoke is mainly interested in railroading, having extensive construction and repair shops of the Norfolk and Western Railroad. Industrially, the city ranks sixth in the State, the value of its products in the census year of 1900 having been $5,710,000. The most important manufactures are cars, locomotives, flouring and grist mill products, bridges, hydraulic engines, agricultural implements, lumber, brick, cigars and tobacco. The government is vested in a mayor, chosen biennially, and a unicameral council. In 1880 Roanoke, then called the town of Big Lick, had a population of only 639. In 1884 it was chartered as a city under its present name. Population, in 1890, 16,159; in 1900, 21,495.

ROANOKE COLLEGE. A coeducational college at Salem, Va., incorporated in 1853 as successor to the Virginia Institute. It remained open during the war, though without endowment, and has since had a rapid development. In addition to the collegiate department, with partially elective courses, leading to the degree of B.A., partial, preparatory, and commercial courses are offered. The attendance in 1903 was 164, with a faculty of 11 instructors. The library contained 22,000 volumes. The endowment was $60,000, the income $14,000, and the value of the grounds and four buildings was $100,000.

ROANOKE ISLAND. An island off the coast of North Carolina, forming part of Dare County and separated from the mainland by Croatan Sound. It is noted as the site selected by Sir Walter Ralegh (q.v.) in his attempt at colonization in 1585-87. On February 8, 1862, a Union force under General Burnside captured the Confederate garrison.

ROARING (*laryngismus paralyticus*). A disease of the horse, usually caused by the pressure of an inflamed or hypertrophied bronchial gland which interferes with the proper functions of the left recurrent larnygeal nerve. In the case of genuine 'roaring' medical treatment is of no avail, but in the earlier stages of the disease a course of iodide of potassium is strongly advocated where the cause of the trouble is to be attributed to disease of the lymphatic glands.

ROARING BUCKIE. The name among British people, especially in Scotland, for the local species of Fusus, a large spiral (conch) shell which, when held to the ear, furnishes a muffled roaring sound which children are told is the sound of the sea in which the creature lived. Really it is the audible reverberation of the otherwise inaudible sound of the rushing of the blood in the internal ear.

ROASTING (in metallurgy). See COPPER.

ROB'ALO (Sp., *róbalo*, Catalan *llobarro*, name for the European bass, probably from Lat. *labrus*, *labros*, from *Gk.* λάβραξ, *labraæ*, sea-wolf, from λάβρος, *labros*, furious, fierce, greedy). Any of several fishes of the tropical shores of America resembling sea-bass, but set apart in the family Centropomidæ. All are robust, dark-colored fishes, from two to four feet in length, and several kinds are of great importance in the local markets. The most valuable in the West Indies and along the Spanish Main is the species *Centropomus undecimalis*, called also 'snook' and 'brochet-de-mer.'

ROBBER-FLY. Any one of the dipterous insects of the family Asilidæ. These are strong, hairy, active, predatory flies, which are very numerous and always conspicuous, flying with a darting motion and preying upon many different kinds of insects. They are rather slender, but extremely strong, and are furnished with a large tapering hard beak inclosing a sharp lancet which is thrust out and cuts a severe wound in the body of the insect captured. The tip of the beak is bearded with stiff bristles which hold it securely in the wound into which it is crowded. They destroy very many injurious insects, but are noted enemies of the honey-bee.

ROBBER SYNOD. See EPHESUS, COUNCILS OF.

ROBBERY (OF. *robberie*, *roberie*, from *robber*, *rober*, to rob, from ML. *raubare*, from OHG. *roubôn*, Ger. *rauben*, Goth. *bi-raubôn*, AS. *réafian*, Eng. *reave;* connected with Lat. *rumpere*, to break, Skt. *lup*, to break, plunder). In substance robbery is an aggravated form of larceny, although at common law it is treated as an independent offense. It consists in the larcenous taking of personal property which is on the person of another, or under the immediate protection of his person, accomplished by means of violence or intimidation. The offense is thus both a crime against property and against the person. The mere force required in the asportation of the property taken is not sufficient to make the crime robbery. Thus pocket-picking by stealth, or even snatching money from the open hand when there is no resistance, is simple larceny. Threats which do not amount to threats of personal violence are not sufficient to constitute the taking robbery, as when one induces another to give up property by threats of criminal prosecution or to injure his reputation by slanderous statements. It has been held otherwise, however, when the threat was to prosecute for an unnatural offense. The violence need not be offered to the person giving up his property, but if offered to a person related to him by blood or marriage, and money or property be extorted for the purpose of protecting such relative from immediate personal violence, the offense is robbery. If the taking is accomplished without threat or violence, the use of violence as a means of retaining possession of the stolen property will not make the crime robbery. At common law robbery was a felony punishable by death. It is still deemed a felony, and is now punishable in England and the United States by penal servitude. See LARCENY. Consult the authorities referred to under CRIMINAL LAW.

ROB'BIA, DELLA. A celebrated family of Florentine sculptors and ceramists of the Renaissance, that flourished for nearly one hundred and fifty years. Its earliest and most widely known member was LUCA DELLA ROBBIA (1399-1482), sculptor and originator of the famous terra-cotta

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LUCA DELLA ROBBIA
MADONNA AND CHILD
SHOP IN THE VIA DELL' AGNOLO, FLORENCE

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productions bearing his name. He was born in Florence, the son of Simone di Marco della Robbia, a shoemaker, and was early apprenticed to a goldsmith. This craft he soon relinquished to work in bronze and marble, and attained great eminence as a sculptor, producing in both materials a series of superior works, by which his artistic standard must primarily be estimated, although he owes his universal popularity chiefly to his process of enameling terra-cotta figures.

Of his life we know very little. He may, as Baldinucci states, have received his training in sculpture from Ghiberti, but while his plastic work bears witness to a diligent study of that master's creations, it also shows an open eye and equally receptive feeling for the radically different art of Donatello. His individuality lies in the admirable equipoise between the idealism of the one and the realism of the other, having in common with Ghiberti the exalted feeling of beauty, the tasteful arrangement and easy flow of drapery, and with Donatello the serious observation of nature and vivid characterization. This is manifest in the master's earliest work known to us, the world-famed "Singing Galleries" (1431-40), ten panels in high relief, with groups of children singing, dancing, and playing upon musical instruments, equally remarkable for their truth and naturalness and for their grace of movement and form—easily Luca's master creation—executed for one of the organ galleries in the Duomo and now in the Cathedral Museum. His other works in marble comprise two unfinished reliefs of the "Deliverance and Crucifixion of Saint Peter" (1438), in the Bargello; the eight allegorical reliefs of "The Liberal Arts and their Representatives" (1437-40), on the north side of the Campanile; the "Tabernacle" (1442), in Santa Maria, at Peretola; and the "Tomb of Benozzo Federighi," Bishop of Fiesole (1457-58), in San Francesco di Paola, on the Via Bellosguardo, outside Florence. The most laborious task, however, on which Luca was engaged in the cathedral was the execution of the bronze door of the north sacristy (1446-67), with reliefs of the "Evangelists," the "Fathers of the Church," etc., each subject with attendant angels, the whole modeled with exquisite grace and unassuming dignity, one of the most perfect productions in bronze of the Quattrocento.

Meanwhile Luca had already entered upon the second phase of his activity and given to the world another new and beautiful art. Discouraged at his slender profits in the fashioning of such works, he endeavored to discover some new material, more plastic and capable of being made as durable as stone. After many experiments he succeeded, by coating his figures of clay with a stanniferous enamel, in producing works almost indestructible and very attractive in color. He was not the inventor of impervious glaze, which had been known and used in Italy for two centuries or more; but its application to sculpture in terra-cotta and that of the latter to architectural decoration was original with Luca, and sufficiently justifies his claim to the title of inventor and the immense vogue of the almost countless productions in enameled terra-cotta, attributed to him, in and out of Italy.

Among his numerous representations of the Virgin and Child, of infinite variety, one of the finest is the "Madonna Between Lily-Bearing Angels," over a shop in the Via dell' Agnolo (see illustration), and of four preserved in the Bargello, the "Madonna Adored by Angels" (from San Pierino on the Mercato Vecchio) and the "Madonna del Fiore" are of superior charm. Very ornamental are the "Five Great Medallions" in pale blue on a richly patterned ground in the vaulting of the mortuary chapel of the Cardinal of Portugal, in San Miniato, completed in 1466 and the last of his works on record. Out of Florence there is especially noteworthy the tympanum of the "Madonna and Four Saints" (1449-52), over the portal of San Domenico, at Urbino, and in non-Italian museums are to be noticed three large circular reliefs, two with allegorical figures of "Temperance" and "Faith," and one with the "Virgin and Child," in the Musée de Cluny, Paris; a huge polychrome medallion with the "Arms of King René of Anjou" (1442), and a "Monk Writing," in the South Kensington Museum, London; while the twelve majolica plaques, emblematic of the months, attributed to Luca, in the same collection, show little affinity with his work. In the Berlin Museum, a thorough study of the master's taste and skill in arrangement, his truth and variety of characterization, is afforded by several original reliefs of the Virgin and Child and a number of cast reproductions of truly human aspect. It should be mentioned that Luca never repeated his subjects, producing in every instance an entirely new creation. In what high esteem Luca was held by his contemporaries is attested by his election, in 1471, to the presidency of the Artists' Guild, which honor, however, he declined on the score of his great age and increasing infirmities. From 1446 to his death on February 20, 1482, he led a peaceful existence with his two orphaned nephews whom he had adopted as his sons.

He left a worthy successor to continue his work in his nephew and pupil ANDREA DELLA ROBBIA (1437-1528). Although inferior to Luca in power and grandeur of conception, Andrea was an artist of exquisite taste and feeling, the celestial charm of his youthful Madonnas reminding one of Mino da Fiesole. Unlike his uncle, he confined himself to works in terra-cotta, with a single exception, existing in the rich marble altarpiece in Santa Maria delle Grazie, outside Arezzo. Besides his many and varied figures of the Madonna, of which three may be seen in the Bargello, he has left us hardly anything more pleasing than those famous medallions with the "Bambini," on the façade of the Spedale degli Innocenti (Foundling Hospital) in Florence, each of the fourteen babes in swaddling clothes a life-like image of infant loveliness, with an individuality of its own. (See illustration to BAMBINO.) Here also, within the court, over the door to the chapel, is a graceful lunette with the "Annunciation." Among five excellent reliefs in the Cathedral of Arezzo, the most remarkable is a retable of the "Trinity." The fine altarpiece with the "Coronation of the Virgin," in the Monastery of L'Osservanza, near Siena, deserves especial notice. At Prato, where many of his best works may still be seen, there is particularly noteworthy the tympanum with a half-length "Madonna Between Saints Stephen and Lawrence" (1489), over the principal entrance to the cathedral. One of his finest works is the large retable of the "Last Judgment" (1501), in San Girolamo, at Volterra. The Berlin Museum contains a "Madonna and Saints," a masterpiece in

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his early manner, and a small "Annunciation," unique in its rich coloring; and the Metropolitan Museum, New York, has a beautiful large retable of the "Assumption" (c.1480), a characteristic specimen of Andrea's art.

Of his seven sons, four worked with him and, after his death, continued to produce the Robbia ware. GIOVANNI (1469-c.1529), the eldest, chiefly assisted his father, and many pieces attributed to the latter are probably by Giovanni. An early example of his independent work is the magnificent "Lavabo" (font, 1497), in the sacristy of Santa Maria Novella, Florence. He is proved an artist of superior merit by the large altarpiece of the "Adoration of the Holy Child" (1521), in the Bargello, but his most elaborate production is the polychrome frieze, representing the "Seven Works of Mercy" (1525-29), in the Ospedale del Ceppo, at Pistoia.—LUCA (1475-c.1560), the Younger, is remembered by a beautiful tile pavement, made in 1518 under Raphael's supervision in the upper story of the Loggie in the Vatican.—GIROLAMO (1488-1566) was an architect and sculptor, went to France in 1528 and was employed by the royal family, notably by Francis I., for whom he built and decorated externally with reliefs in Robbia ware the Château de Madrid, in the Bois de Boulogne.

BIBLIOGRAPHY. On the entire family and school, consult the monographs by Barbet de Jouy (Paris, 1855), Cavallucci and Molinier (ib., 1884), Reymond (Florence, 1897), and Burlamacchi (London, 1900); also Bode, in Dohme, *Kunst und Künstler Italiens*, i. (Leipzig, 1879); id., *Florentiner Bildhauer der Renaissance* (ib., 1902); Van Rensselaer, in *The American Architect*, xvii. (Boston, 1885); "Luca della Robbia and His School," in *The Church Quarterly Review*, xxi. (London, 1886); Stegmann, "Die Bildhauerfamilie della Robbia," in Geymüller-Stegmann, *Die Architektur der Renaissance in Toscana* (Florence, 1885-96); and Vasari, *Lives*, etc., trans. and ed. by Blashfield and Hopkins, vol. i. (New York, 1896).

ROB'BINS, WILFORD LASH (1857—). An American clergyman of the Protestant Episcopal Church, born in Boston. He graduated at Amherst in 1881, studied at the Cambridge (Mass.) Divinity School (B.D. 1889), was ordained priest in 1884, and held a parochial charge at Lexington, Mass. In 1887 he became dean of All Saints Cathedral Church, Albany, N. Y., and in 1903 was elected dean of the General Theological Seminary, New York City. He was known for his pulpit utterances prior to the appearance of his *Essay Toward Faith* (1901) and *A Christian Apologetic* (1902), works much read in England as well as in the United States.

ROB'ERT, *Fr. pron.* rô'bâr' (c.1054-1134). Duke of Normandy from 1087 to 1106. He was the eldest son of Duke William II. (later William I. of England), and early in life showed great skill in arms, but also habitual carelessness and indolence. His father refused to give him any share in the government, and Robert repeatedly rebelled against him. On the death of William, in 1087, he received Normandy as his inheritance. His rule was weak in the extreme and he involved himself in quarrels with his brothers William II. of England and Henry (later Henry I.). Finally in 1096 Robert assumed the cross, and pledged his duchy to William for five years for ten thousand marks. In the crusade Robert proved to be at his best and he became one of the heroes of the expedition. After the capture of Jerusalem (1099), the royal crown was offered to him, but he refused, and returned to Normandy, arriving there in 1100. William II. was dead, and so Robert was released from his pledge, but he was soon engaged in war with Henry I. Finally Henry invaded Normandy, and at the battle of Tinchebray, September 29, 1106, Robert was defeated and captured. He was kept in confinement for the rest of his life, dying at Cardiff, February 10, 1134. Consult Freeman, *History of the Norman Conquest* (6 vols., Oxford, 1867-79).

ROBERT I., THE DEVIL (?-1035). Duke of Normandy from 1028 to 1035. He was a son of Duke Richard II., and succeeded his brother Richard III. as Duke of Normandy. He combined cruelty and unscrupulousness with energy, audacity, and a handsome figure. He humiliated his vassals, and conquered districts from his neighbors. He espoused the cause of Count Baldwin IV. of Flanders against his son; of Henry I. of France against his mother Constance; and of his nephews Alfred and Edward of England against Canute of Denmark. In 1033 he undertook a pilgrimage to Jerusalem, as a penance for his sins. He died in 1035 while on his return, and was succeeded by his natural son William, later the conqueror of England. Many legends arose concerning him, like that embodied in the novel, *La vie du terrible Robert le Diable, lequel fut après l'homme de Dieu*, which appeared at Paris in 1496. Consult Richomme, *Origines de Falaise*, etc. (Falaise, 1851).

ROBERT II. (971-1031). A king of France, son of Hugh Capet, whom he succeeded on the throne in 996. He was educated by Gerbert of Rheims, was a scholar and a poet, and especially prominent as a composer and hymn-writer, and gained the surname "The Pious." His rule was weak and unfortunate, and the country suffered from the Papal interdict laid upon the King because of his marriage with Bertha of Burgundy, his cousin. He put her away in 1004 and married Constance of Arles, daughter of Guillaume Taillefer of Toulouse, a selfish and ambitious woman. Consult Pfister, *Etudes sur le règne de Robert le Pieux* (Paris, 1885).

ROBERT I. King of Scotland, better known as Robert Bruce (q.v.).

ROBERT II. (1316-90). King of Scotland from 1371 to 1390. His father was Walter, the Steward of Scotland, and his mother Marjory, daughter of Robert Bruce. During the reign of his uncle, David II., he was one of the most prominent of the patriotic nobles of Scotland, acting as Regent or joint Regent during three different periods, and he was present at the battle of Halidon Hill (1333) and Neville's Cross (1346). On the death of David he obtained the crown, and became the founder of the Stewart, or Stuart, dynasty, in virtue of the law of succession adopted by the council of estates held in 1318. Partly from disposition and partly from the infirmities of age, Robert proved a peaceable, inactive ruler. The wars waged with England after 1377 were conducted by the powerful barons, particularly the Earls of Douglas, Mar, and Moray. These contests, which consisted to a large extent of border

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raids, caused great suffering on both sides. The chief incidents of Robert's reign were the attack on Scotland by an English military and naval force under the command of the Duke of Lancaster (see JOHN OF GAUNT); the invasion of King Richard II. himself in 1385, which wasted the land as far as Edinburgh and Fife; and the retaliatory expedition of the Scotch in 1388, when two armies invaded and devastated England. The smaller body on its return home won, though at the expense of the life of its gallant leader, James, Earl of Douglas, the brilliant victory of Otterburn. (See CHEVY CHASE.) In 1389 the estates practically deposed Robert by making his son guardian of the kingdom. Robert died at his castle of Dundonald, in Ayreshire, May 13, 1390. Consult: Tytler, *History of Scotland*, various editions; Stuart, *History of the Stuarts* (London, 1798).

ROBERT III. (c.1340-1406). King of Scotland from 1390 to 1406. He was the son of Robert II. He was originally called John, Earl of Carrick, but changed his name on his accession to the throne in order to continue the name held by his father and grandfather. His ineptitude as a ruler virtually placed the reins of government in the hands of his ambitious brother, Robert, Earl of Fife, whom, in 1398, he created Duke of Albany. The latter in 1402 probably brought about the death of the King's eldest son, the Duke of Rothesay, because he was in danger of being ousted from control. The principal events in Robert's reign were the invasion of Scotland in 1400 by Henry IV., of England, and the retaliatory expedition of the Scotch, which resulted in the complete defeat of the invaders at Homildon Hill (q.v.). Robert died at Rothesay, April 4, 1406, from grief, as is said, because his remaining son, later James I. (q.v.), was captured by the English while on his way to France. Sir Walter Scott, in the *Fair Maid of Perth*, has used some historical and traditional incidents of Robert's reign. Consult authorities cited under ROBERT II.

ROBERT, CHRISTOPHER RHINELANDER (1802-78). An American philanthropist, born at Brookhaven, Long Island. After five years as a shipping clerk in New York he removed to New Orleans, where he entered business for himself. In 1830 he returned to New York and founded the firm of Robert & Williams, of which he continued the senior member until his retirement from active business in 1862. At the time of the Crimean War he visited Constantinople and became interested in the subject of higher education in the Turkish Empire. In 1860 he invited the Rev. Cyrus Hamlin (q.v.) to visit the United States for the purpose of raising funds to endow a college on the Bosporus and he himself subscribed $10,000. The outbreak of the Civil War soon afterwards, however, made it impossible to arouse general interest in the project, so Mr. Robert undertook to carry it through alone. Until his death in 1878 he provided the running expenses of the college, and in his will left it one-fifth of his estate, his benefactions aggregating more than $400,000.

ROBERT, rō'bĕrt, KARL (1850—). A German archæologist and classical philologist, professor in the University of Halle. He was born at Marburg. His most important publications are: *Eratosthenis Catasterismorum Reliquiæ* (1878); *Bild und Lied* (1881); *Antike Sarkophag-Reliefs* (1890); *Studien zur Ilias* (1901). He was also co-editor of *Hermes* and reviser of Preller's *Griechische Mythologie*, 4th ed. vol. i. (1893).

ROBERT, rō'bâr', LÉOPOLD (1794-1835). A Swiss-French genre painter, born at Les Esplatures, near La Chaux-de-Fonds, Switzerland. He studied engraving with Girardet, and painting under David and Gros. He went to Italy in 1818, and began what proved to be a popular series of pictures from brigand life. Afterwards he painted Italian peasants, such as "The Neapolitan Improvisator" (1824), "Peasant Women of the Campagna" (1824), and "Festival of the Madonna dell' Arco" (1827), all in the Louvre. His works are large figure compositions, lacking spontaneity, hard in color, and with academic precision of line. Robert was the first to paint subjects from contemporary life when everything classic was the fashion. For this reason he has been claimed by the Romanticists, but he remained at heart a Classicist. He committed suicide in Venice in 1835. Consult Delécluze, *Notice sur la vie et les ouvrages de Léopold Robert* (Paris, 1838).

ROBERT D'ARBRISSEL, dăr'brē'sĕl'. The founder of the Order of Fontevrault (q.v.).

ROBERT DE LUZARCHES (?-1223). A French architect of the Gothic period. His name is derived from his birthplace in the Ile de France, of which school of architecture he was a lay member. In 1220 he was entrusted by Evrard de Fouilly, Bishop of Amiens, with the reconstruction of the cathedral, which had been destroyed by fire two years previously. He furnished the general plan and directed the work, beginning, contrary to custom, with the nave. At the time of his death at Amiens, in 1223, the nave and south side of the transept had been carried to the height of several meters. His plans were, in the main, followed by his successors, Thomas de Cormont and his son Renaud, and we may therefore ascribe to him the general constructive features of the cathedral, which represent the highest and most perfect development of Gothic architecture in France. The school of architecture which he founded at Amiens became one of the most influential in France, and its influence radiated throughout Europe. In Germany, for instance, the Cathedral of Cologne is modeled upon that of Amiens.

ROBERT-FLEURY, flē'rē', JOSEPH NICHOLAS (1792-1890). A French historical painter, born at Cologne. He was a pupil of Girodet, Gros, and Horace Vernet at Paris, where he settled in 1826, after studying also for some time at Rome. In order to make his paintings historically accurate, he made deep studies of the period to be represented, even adopting the technical qualities of the painting of the epoch represented. His most important works include "Charles V. in the Monastery of Saint Yuste" (1857), "Massacres of Saint Bartholomew" (1833), the "Religious Conference at Poissy" (1840), "Jane Shore" (1850), and the "Pillage of a Jew's House, Venice" (1855), the last three in the Luxembourg Museum. His son, TONY ROBERT-FLEURY (1838—), an historical, genre, and portrait painter, was a pupil of Paul Delaroche and Léon Cogniet. In 1870 he won the grand medal of honor for the "Last Day of Cor-

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inth," which was afterwards selected to illustrate French art in the Luxembourg, as well as in the Universal Exposition, 1878. Among other works are "The Old Women of the Piazza Navona, Rome" (1867, Luxembourg), "Danaids," "Mazarin and His Nieces," and the "Musical Cardinal."

ROBERT LE DIABLE, rô'bâr' le dyä'bl'. An opera by Meyerbeer, produced in 1831, based upon the character of Robert I., the Devil (q.v.), Duke of Normandy.

ROBERT OF GLOUCESTER, glŏs'tẽr. An English (metrical) chronicler, of whom nothing is known, except that he was alive about the time of the great battle of Evesham (1265). The verse-chronicle bearing his name is a history of England. It exists in two recensions, which vary but little down to the end of the reign of Henry I. (1135). From this date they differ greatly, the one continuation being much longer than the other. Robert of Gloucester is usually credited with the longer continuation and may have written the original portion. The shorter continuation is apparently from another hand. The older portion was derived mainly from Geoffrey of Monmouth, Henry of Huntingdon, and William of Malmesbury. Thus only the longer continuation has value as an historical document, and the valuable part is that which deals with the Barons' War under Henry III., and as a whole the chief interest in the chronicle is linguistic. It is in the dialect of Gloucestershire, with which district the author shows minute familiarity. The principal extant manuscripts are the Harleian, the Cottonian, the Cambridge, and the Bodleian. The chronicle was edited by Hearne (Oxford, 1724; reissued 1810), and by Aldis Wright for the Rolls Series (2 vols., London, 1887).

ROB'ERTS, Benjamin Stone (1811-75). An American soldier, born at Manchester, Vt. He graduated at West Point in 1835, and became first lieutenant in July, 1837, but in 1839 resigned from the army. He then became a civil engineer, built the Champlain and Ogdensburg Railway, and in 1842 assisted in constructing the Russian railway system. In May, 1846, he reëntered the United States Army as first lieutenant of mounted rifles, served under General Scott in the Mexican War, and was brevetted major for gallantry at Chapultepec, and lieutenant-colonel for services at Matamoros and the Pass of Galaxara. During the Civil War he served for a time in New Mexico as commander of the Southern District, and in July, 1862, was made brigadier-general of volunteers. He was then transferred to Virginia, where, as chief of cavalry and acting inspector-general, he fought at Cedar Mountain, Rappahannock Station, and the second battle of Bull Run. He was next sent to the Northwest, where he commanded an expedition against the Chippewa Indians. In 1864 he was made chief of cavalry in the Department of the Gulf, and early in 1865 was put in command of the District of West Tennessee. In March of the same year he was brevetted brigadier-general in the Regular Army. In 1866 he was appointed lieutenant-colonel of the Third Cavalry, and from 1868 to 1870 was professor of military science at Yale. He was the inventor of the Roberts breech-loading rifle.

ROBERTS, Benjamin Titus (1823-93). An American divine, one of the founders of the Free Methodist Church, born in Leon, N. Y., and educated at Wesleyan University, where he graduated in 1848. For ten years he was a member of the Genesee Conference of the Methodist Episcopal Church and prominent among a body of strictly Wesleyan reformers whose criticism of modern conditions he voiced in the *Northern Independent* in 1857. This article was adjudged a slander and Roberts was expelled from the Church (1858). In 1860, with Joseph McCreery and others, he formed the Free Methodist Church, with changes of creed and government from the Methodist Episcopal Church, and special stress on the necessity of total abstinence, plainness of dress, and so on. Roberts was general superintendent of the new denomination (1860-93), and president of its seminary in North Chili, N. Y. He founded and edited *The Earnest Christian* (1860-93), and edited *The Free Methodist* (1886-90).

ROBERTS, Charles George Douglas (1860—). A Canadian poet and story writer, born at Douglas, near Fredericton, New Brunswick. He was educated at the Fredericton Collegiate School, and at the University of New Brunswick. For a short time he edited Goldwin Smith's newspaper, *The Week*, of Toronto (1883-84), and was professor of English and French literature in King's College, Nova Scotia (1885-87), and of economics and international law (1887-95). He resigned to devote himself wholly to literature. In 1897 he became associate editor of the *Illustrated American*, of New York. His volumes of verse comprise *Orion and Other Poems* (1880), *In Divers Tones* (1887), *Ave: An Ode for the Shelley Centenary* (1892), *Songs of the Common Day* (1893), *The Book of the Native* (1897), *New York Nocturnes* (1898). His prose includes *The Canadians of Old*, from the French of de Gaspé (1889), *Appleton's Canadian Guide* (1890), *The Raid from Beauséjour* (1894), *Reube Dare's Shad Boat* (1895), *Around the Camp Fire* (1896), *Earth's Enigmas* (1896), *A History of Canada* (1897), *The Forge in the Forest* (1897), *A Sister to Evangeline* (1898), *By the Marshes of Minas* (1900), *The Heart of the Ancient Wood* (1900), *The Kindred of the Wild* (1902), and *Barbara Ladd* (1902). Roberts is one of the very few who have written about wild life without forsaking truth. His work shows not only understanding but imagination. See Canadian Literature.

ROBERTS, David (1796-1864). An English landscape and architectural painter, born at Stockbridge, near Edinburgh. He studied at the Trustees' Academy, Edinburgh, and began his career as scene-painter for Glasgow, Edinburgh, and London theatres, but executed no pictures of merit until after his first tour of the Continent in 1824. Afterwards he traveled extensively in Europe and in the East, devoting himself particularly to architecture and interiors. In 1841 he was made Royal Academician. Roberts produced works in both oils and water-colors. Among the former are "Interior of the Cathedral, Burgos," and the "Church of Saint Paul at Antwerp," National Gallery; "Antwerp Cathedral," London City Gallery; and "Sunset in Rome," Edinburgh National Gallery. The South Kensington Museum has several of his water-colors, including the "Great Temple of Edfou,

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Egypt" (1838), "Pyramids from the Nile" (1845), and a "Gateway, Spain." As a result of his travels Roberts published several series of lithographed sketches (1839-59), the best known of which are *Sketches in Holy Land and Syria* and *Italy, Historical, Classical, and Picturesque.* His strength lies in a fine feeling for architectural effect, and in good detailed drawing rather than in color.

ROBERTS, EDMUND (1784-1836). An American diplomat, born at Portsmouth, N. H. At the age of sixteen he went to South America, and upon the death of a relative took charge of a large English mercantile house at Buenos Ayres. After living in London for a while he returned to the United States, and in 1832 was sent by President Jackson as an envoy to Siam, Cochin-China, and other countries of the Far East for the purpose of making commercial treaties. He returned in 1834 after successfully treating with Siam and Muscat, and in 1835 he started upon a second embassy, with Japan as the ultimate goal. Illness overtook the expedition and Roberts died at Macao, China, June 12, 1836, where he was buried. He narrated the history of his first expedition in *Embassy to Eastern Courts* (1837). Consult: Ruschenberger, *A Voyage Around the World, Including an Embassy to Muscat and Siam* (Philadelphia, 1838); Foster, *American Diplomacy in the Orient* (Cambridge, 1903).

ROBERTS, ELLIS HENRY (1827—). An American journalist and financier, born in Utica, N. Y., and educated at Yale. From 1851 to 1890 he was editor and for several years was proprietor of the Utica *Morning Herald,* a Whig and subsequently a Republican paper. He was a member of the State Legislature in 1867, and of Congress from 1871 to 1875, was Assistant Treasurer of the United States from 1889 to 1893, and was president of the Franklin National Bank, New York City, from 1893 to 1897, when he became Treasurer of the United States. He published *Government Revenue* (1884), and *New York, The Planting and Growth of the Empire State* (1887), in the "American Commonwealth Series."

ROBERTS, Sir FREDERICK SLEIGH, Earl Roberts of Kandahar, Pretoria, and Waterford (1832—). An eminent British soldier, son of General Sir Abraham Roberts, born at Cawnpore, in India, on September 30, 1832. He was educated at Eton, at the Royal Military College at Sandhurst, and at the college of the East India Company, at Addiscombe. At the close of 1851 he received a commission in the Bengal Artillery, and was sent to Peshawur, near the frontier of Afghanistan, where he served until 1857. During the Sepoy Mutiny, he actively participated in the reduction of Delhi, in the second relief and the siege of Lucknow, and in the relief of Agra and of Cawnpore, and was awarded the Victoria Cross. In 1863 he participated in the Umbeyla campaign and in 1867 became assistant quartermaster-general of the Bengal brigade which took part in the Abyssinian War.

At the outbreak of the Afghan War in 1878, though only a major in his regiment, he was major-general commanding in his division, that of Peshawur, and was selected to command one of the three columns organized to invade the enemy's country, being ordered to advance through the Kuram Valley to the Shutargardan Pass. On December 2d, at the Peiwar Kotal, the summit of the pass leading from the Kuram Valley into Afghanistan, Roberts defeated a greatly superior force of the enemy. In October, 1879, he defeated a large force of Afghans, near Kabul, and took that city. In December, after a series of combats, he found it necessary to evacuate Kabul, and collected his forces in a fortified position at Shirpur. Here he beat back the enemy and reëntered the Afghan capital before the close of the month. In 1880 he performed a memorable march from Kabul for the relief of Kandahar, which he entered on August 31st. On the following day he dispersed the army of Ayub Khan, thus bringing the war to a close. After the British disaster at Majuba Hill, Roberts was sent to South Africa as commander-in-chief. Before his arrival, however, peace had been concluded. He was commander-in-chief of the Madras Army from 1881 until 1885, when he became commander-in-chief in India. In 1893 he was recalled to Europe and from 1895 until 1899 was in command of the forces in Ireland. In the latter year he was appointed commander-in-chief in South Africa. He marched successfully to the relief of Kimberley, and on February 27th, at Paardeberg, a force of Boers under Cronje was compelled to surrender. On March 13th Roberts entered Bloemfontein, the capital of the Orange Free State, and on May 28 formally annexed the Free State to the British Empire. On June 5th he occupied Pretoria, and on October 25th formally annexed the Transvaal. A few weeks later, thinking the war practically over, he returned to England, where he was decorated with the new Order of Merit, raised to the rank of earl and appointed commander-in-chief of the British Army. Lord Roberts published *The Rise of Wellington* (1895), and *Forty-one Years in India* (1897), an autobiography. For a more detailed account of his services in the Boer War, see SOUTH AFRICAN WAR.

ROBERTS, HOWARD (1843-1900). An American sculptor, born in Philadelphia. He was a pupil of Joseph A. Bailly at the Pennsylvania Academy of Fine Arts, and afterwards studied in Paris under Dumont and Gumery. His works include: "Hester and Pearl" (1872), a statuette; "La Première Pose" (1876); "Hypatia," and "Lot's Wife," both statuettes; a statue of Fulton in the Capitol at Washington, and numerous busts.

ROBERTS, ISAAC PHILLIPS (1833—). An American agriculturist and educator. He was born in Seneca County, N. Y. He became superintendent of the college farm at the Iowa State Agricultural College, and secretary of the board of trustees (1869), and in 1870 was elected professor of agriculture. He was awarded the degree of master of agriculture (1875) by this college. In 1873 he was elected professor of agriculture in Cornell University, in which institution he became dean of the College of Agriculture (1874) and director of the college and of the United States Agricultural Experiment Station (1888). In 1903 he became professor emeritus of agriculture in the university. For many years he was assistant editor of the *Country Gentleman,* and contributor to the columns of other leading agricultural journals. His published works in-

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clude: *The Fertility of the Land* (1898); *The Farmstead* (1900); *The Farmer's Business Hand-Book* (1903); and *The Horse* (1904).

ROBERTS, MORLEY (1857—). An English novelist and journalist, born in London, and educated at the Bedford Grammar School and at Owens College, Manchester. In 1874 he went out to Australia, where he worked as a laborer on the railroads and in the bush. Before 1887 he served as a sailor on several merchant ships, and saw many phases of Anglo-Saxon life in the South Seas, throughout North America, and in South Africa. His experiences enrich his many tales of adventure. Good specimens are *A Son of Empire* (1899) and *The Plunderers* (1900), giving an account of a sort of Jameson raid on the treasury of the Shah of Persia. *The Colossus* (1899) has as characters well-known politicians, as Cecil Rhodes, thinly disguised under fictitious names. Other romances are: *The Western Avernus* (1887); *In Low Relief* (1890); *Red Earth* (1894); *The Master of the Silver Sea* (1895); *Maurice Quain* (1897); *Strong Men and True* (1897); *The Descent of the Duchess* (1900); *The Fugitives* (1901); a volume of verse called *Songs of Energy* (1891); *Immortal Youth* (1902); and *The Way of a Man* (1902).

ROBERTS, ORAN MILO (1815-98). An American jurist and Governor, born in Laurens County, S. C. He graduated at the University of Alabama in 1836, was admitted to the bar in 1837, practiced law for some time, and in 1841 removed to the Republic of Texas. After the admission of Texas to the Union in 1846 he served until 1851 as a district judge. In 1857 he was elected an associate justice of the Texas Supreme Court. In 1862 he became colonel of the Eleventh Texas Volunteers, and saw active service with the Confederate forces west of the Mississippi until 1864, when he resigned his commission to become Chief Justice of the Texas Supreme Court. Displaced during the reconstruction period, he was active in the new constitutional convention in 1866, and in the same year was elected United States Senator, but political disabilities prevented his taking his seat. In 1874 he again became Chief Justice of the State and he remained on the bench until he was elected Governor in 1878. He was reëlected in 1880, and declined a third term in 1882. From 1883 until 1893 he was a professor of law in the State University. He was the author of *A Description of Texas* (1881); *Elements of Texas Pleading* (1891); and *Our Federal Relations* (1892), a statement of the Southern side of the slavery controversy.

ROBERTS, Sir WILLIAM (1830-99). An English physician, born at Bodedern, Wales, and educated at University College, London. After studying in Paris and Berlin he became house surgeon, and in 1855 full physician to the Manchester Royal Infirmary—a post which he held until 1883. He was a fellow of the Royal Society, received the Cameron prize in 1879, and on his coming to London became a fellow of London University. The use of predigested foods for the nutriment of invalids was introduced into England by him and he was an authority on diet. Roberts wrote: *Blood Corpuscles Under Influence of Solutions of Magenta and Tannin* (1863), in which 'Roberts's maculæ' were described; *Urinary and Renal Diseases* (1865; 4th ed. 1885); *Digestive Ferments* (Lumleian Lectures, 1880); and *Dietetics and Dyspepsia* (1885).

ROBERTS, WILLIAM CHARLES (1832—). An American Presbyterian minister and educator, born near Aberystwith, Wales. He graduated at Princeton University in 1855, and at Princeton Theological Seminary in 1858, and in that year became pastor of a church in Wilmington, Del. Afterwards he had charge of churches in Columbus, Ohio, and Elizabeth, N. J. From 1880 until 1886 he was corresponding secretary of the Board of Home Missions, New York City, and again from 1892 until 1898. In 1886-92 he was president of Lake Forest University, Chicago, and in 1898 was made president of Centre College, Ky.

ROBERTS, WILLIAM HENRY (1844—). An American Presbyterian clergyman, born at Holyhead, Wales. He graduated at the College of the city of New York in 1863 and at Princeton Theological Seminary in 1873. Meanwhile he had been statistician in the United States Treasury Department, and assistant librarian of Congress. In 1878-86 he was librarian at Princeton Theological Seminary. From 1886 until 1893 he was professor in Lane Theological Seminary, Cincinnati, Ohio. His works include: *History of the Presbyterian Church* (1888); *The Presbyterian System* (1895); and *Laws Relating to Religious Corporations* (1896).

ROBERTS, WILLIAM MILNOR (1810-81). An eminent American civil engineer, born in Philadelphia, Pa. He began his service as an engineer in 1825, when he became a member in a minor capacity of the engineer corps engaged in the construction of the Union Canal of Pennsylvania. From 1827 to 1831 he was engaged on the improvement of the Lehigh Railroad Canal; from 1831 to 1835 was senior assistant engineer in the construction of the Allegheny Portage Railroad, and from 1835 to 1837 was chief engineer of the Lancaster and Harrisburg Railroad, acting in 1836 and 1837 as chief engineer of the Cumberland Valley Railroad as well. In 1838-40 he was chief engineer, in the State service, of the extension of the State canals of Pennsylvania, and during 1841-44 was engaged successively on the enlargement of the Welland Canal of Canada and the Erie Canal of Pennsylvania. From 1857 to 1865 he lived in Brazil, constructing during this time the Dom Pedro Segundo Railroad. From 1869 to 1879 he was chief engineer of the Northern Pacific Railroad, and during this period was a member, also, of various important engineering commissions. He died of yellow fever on July 14, 1881, in the Province of Minas Geraes, Brazil.

ROBERTS-AUS'TEN, Sir WILLIAM (1843-1902). An English metallurgist, educated at the Royal School of Mines. He was appointed chemist of the mint in 1870; in 1880 succeeded Percy as professor of metallurgy in the Royal School of Mines; and during the last year of his life was deputy master of the mint *ad interim*. His most important work was in the study of alloys, and his reports (1891, 1893, 1897, 1899) developed the system of the cooling curve, showed the significance of metallic freezing points, and in general greatly advanced the molecular theory of alloys. Roberts-Austen improved the pyrometer, making it photographically self-recording, and

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devised methods for several new alloys, among them that of gold and aluminum.

ROBERTSON, Agnes. An English actress. See Boucicault, Mrs. Dion.

ROBERTSON, Frederick William (1816-53). One of the most famous of English preachers. He was born in London, February 3, 1816, and was educated at Edinburgh. After a year spent in the study of law, at the age of twenty-one he was entered at Brasenose College, Oxford, to study for the ministry, and immediately on his graduation in 1840 he was ordained deacon. His first curacy was that of Saint Maurice and Saint Mary Kalendar, Winchester; but his health failed at the end of a year and he was forced to seek rest on the Continent. His next curacy was at Christ Church, Cheltenham, where he remained four years, and then again sought rest in the Tyrol. In 1847 he went to Saint Ebbe's, Oxford, and from there, in August of the same year, to Trinity Chapel, Brighton. This was the scene of his most successful labors, and he is familiarly known as 'Robertson of Brighton.' But he was not strong, and the work was hard. In 1852 he gave signs of failing health, and he died the following year.

Robertson was a man of singular beauty and strength of character. He inherited military spirit and was celebrated for the soldierly qualities of courage, self-devotion, and adherence to duty. Theologically he began as a moderate Calvinist of the Evangelical type, but he became dissatisfied with Evangelicalism during his four years at Cheltenham, and after a bitter struggle embraced opinions which antagonized the orthodoxy of his day and marked him as a 'Broad' churchman. At one time, in the early days of his ministry, he cultivated the ascetic life with great rigidity, but broke down under the physical strain. He was preëminently a preacher rather than a theologian, and his fame rests almost exclusively upon his sermons and addresses at Brighton, which have been published in many editions. In his character and his preaching he appealed to thoughtful men of all classes in society and of all shades in religious belief. The devotion of the workingmen of Brighton to him was pathetic. He practically founded their institute and they found in him a friend and brother. The handsome monument erected to his memory in the cemetery at Brighton bears on one of its faces their tribute to his memory in the bronze medallion which they placed on their benefactor's tomb. Consult the *Life and Letters of F. W. Robertson*, edited by Stopford Brooke (London, 1865).

ROBERTSON, George Croom (1842-92). A Scottish philosopher, born at Aberdeen. He took his degree of M.A. at the University of Aberdeen (1861), where he formed a lasting and helpful friendship with Prof. Alexander Bain (q.v.), and continued his philosophical studies at University College, London, and in France and Germany. After holding a minor appointment in Greek at Aberdeen, he was elected (1866) professor of mental philosophy and logic in University College. This position he held till just before his death. In spite of ill health, Robertson exerted a great influence on his time. He was the first editor of *Mind*, and wrote important articles for the ninth edition of the *Encyclopædia Britannica*. His contributions to *Mind* were edited with a memoir by Professor Bain under the title *Philosophical Remains* (London and Edinburgh, 1894); and two volumes of his lectures at University College from 1870 to 1892 were edited from notes by Rhys Davids under the titles *Elements of General Philosophy* and *Elements of Psychology* (London, 1896).

ROBERTSON, James (1725-88). An English soldier, Governor of New York during a part of the Revolutionary War. He was born in Fifeshire, and while a young man entered the army as a private. He served in America in the French and Indian War, first as major in the Royal American Troops, then as deputy quartermaster, and finally as lieutenant-colonel in the campaign against Ticonderoga. After the war he became barrack master in New York City, and is said to have acquired a fortune by clipping the coin used in buying supplies and by other unscrupulous methods. He was promoted colonel in 1772, was with the British army during the siege of Boston, and commanded a brigade at the battle of Long Island. He was made a major-general in 1779, and in the same year was appointed civil Governor of New York. His administration was arbitrary and corrupt, and by his actions he alienated many who were still favorable to the royal cause. In 1781 he was appointed commander-in-chief in Virginia, but owing to the arrival of Cornwallis in that province, he returned to New York. He died in London. Consult Jones, *History of New York During the Revolutionary War*, edited by De Lancey (New York, 1879).

ROBERTSON, James (1742-1814). An American pioneer, born in Brunswick County, Va., whence his parents early removed to North Carolina. In 1770 he crossed the Alleghanies with Daniel Boone, and lived for a time on the Watauga River. He returned to North Carolina, and in 1771 led a party of settlers to the Watauga region, and was one of the founders of the Watauga Association (q.v.). When this region was found to be a part of the Cherokee lands of North Carolina, Robertson went as commissioner to the Indians. With John Sevier (q.v.) and forty men he withstood a fierce attack on the fort by the Indians under Oconostota. In 1778 he joined Richard Henderson (q.v.) in the settlement of a large tract of land on the Cumberland, and founded Nashborough (the present city of Nashville). On the formation of the 'Compact' in 1780 he was elected chairman of the board of 'General Arbitrators' or 'Notables' and colonel of the forces. Robertson was almost constantly engaged in Indian battles, led the Cold Water Expedition in 1785, and invaded the Indian country. On the organization of Tennessee as a Territory in 1791, he became brigadier-general of the western or Miro district. He was a member of the convention to form a State Constitution in 1786, and afterwards acted as Indian agent. He was a State Senator in 1798, and a trustee of the Davidson Academy (Cumberland College) in 1803. In 1805, as special agent to the Chickasaws, he secured by the compact of July 23d the cession of much of their land, and the same year secured the Choctaw lands in Mississippi. He was afterwards called upon to arbitrate differences arising from confusion of boundaries. During the War of 1812 he did much to prevent the Indians from joining the British. Consult: Putnam, *Life and Times of*

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Gen. James Robertson (Nashville, 1859); and Roosevelt, *Winning of the West* (New York, 1889-96).

ROBERTSON, JAMES CRAIGIE (1813-82). An English clergyman and historian. He was born at Aberdeen, graduated from Trinity College, Cambridge, in 1834, and was ordained in 1836. He began literary work during his early clerical appointments and his first book, *How Shall We Conform to the Liturgy?* (1843), showed the liberal tendencies of his mind. In 1846 he became vicar of Bekesbourne, and canon of Canterbury in 1859, retaining this office to the time of his death; from 1864 to 1874 he was professor of ecclesiastical history at King's College, London. His works, more notable for accurate learning than for literary style, comprise a *History of the Christian Church from the Apostolic Age to the Reformation* (1874-75); *Becket, a Biography* (1859); *Plain Lectures on the Growth of the Papal Power* (1876); editions of Heylyn's *History of the Reformation* (1849); *Bargrave's Alexander VII. and the College of Cardinals* (1866) for the Canadian Society; and *Materials for the History of Archbishop Thomas Becket* (6 vols., 1875-82) for the Master of the Rolls. Volume vi. of the last, being uncompleted at his death, was finished by Dr. J. Brigstocke Sheppard.

ROBERTSON, JAMES LOGIE (pen-name, HUGH HALIBURTON) (1846—). A Scottish verse-writer, born at Milnathort, Kinross-shire. He took the degree of M.A. from the University of Edinburgh in 1872, with honors in English literature. He became first English master in the Ladies' College at Edinburgh (1891). Travels in Scandinavia furnish him descriptive themes for some of his verse, but his best poems are short pastorals in the Scottish dialect. His published volumes are mainly *Poems* (1878); *Orellana and Other Poems* (1881); *Our Holiday Among the Hills* (conjointly with his wife, 1882); *Horace in Homespun* (1886; new ed. 1900); *Ochil Idylls* (1891); *Adaptations from Dunbar* (1895); *The White Angel, and Other Stories* (1886); *For Puir Auld Scotland* (1887); *In Scottish Fields* (1890); and *Furth in Field* (1894). His editorial work concerns the poems of Allan Ramsay (1887), Thomson (1891), Scott (1894), and Burns (1896), and the Select Chaucer (1902).

ROBERTSON, JOSEPH (1810-66). A Scottish antiquary and historian. He was born at Aberdeen; was educated at Marischal College, Aberdeen, and was apprenticed to the law, which he gave up for literature. He bore the chief hand in the formation of the Spalding Club for printing the historical and literary remains of the northern counties of Scotland (1839); edited, in turn, the *Aberdeen Constitutional*, the *Glasgow Constitutional*, and the *Edinburgh Courant;* and was appointed historical curator in the Edinburgh Register House (1853). Robertson's work comprises *Deliciæ Literariæ* (1839), a volume of table-talk; *Illustrations of the Topography and Antiquities of Aberdeen and Banff* (4 vols., 1842-69); *Diary of Gen. Patrick Gordon, 1635-99* (1862); *Inventories of Jewels, Dresses, Furniture, Books, and Paintings Belonging to Queen Mary* (Bannatyne Club, 1863); and *Concilia Ecclesiæ Scoticanæ, 1225-1559* (Bannatyne Club, 1866), a work displaying immense research in the ecclesiastical history of Scotland. To the *Quarterly Review* (June, 1849) Robertson contributed a valuable essay on *Scottish Abbeys and Cathedrals.* Consult the *Memoir* prefixed to this last work (Aberdeen, 1891).

ROBERTSON, THOMAS WILLIAM (1829-71). An English dramatist. He was born at Newark-on-Trent, of a family connected with the theatre for several generations. Mrs. Kendal (q.v.) was his youngest sister. During his childhood and youth he was an actor in the provincial company of which his father was manager. He went to London in 1848 and became a writer for the magazines; for a time, too, he continued upon the stage, and in 1856 he married an actress, Miss Burton. His first play, *A Night's Adventure*, was produced by Farren at the Olympic Theatre in 1851. His first important success, however, was *David Garrick*, which was brought out in 1864, and with Sothern's acting had afterwards a long run. His *Society* was produced by the Bancrofts at the Prince of Wales' Theatre in 1865. His reputation chiefly rests upon the series of comedies which succeeded it, including *Ours* (1866), *Caste* (1867), *Play* (1868), *School* (1869), and *M. P.* (1870). These are exhibitions of modern social life, with an element of satire directed at its artificialities. The epithet 'teacup and saucer school' of drama, which was applied by a critic to Robertson's work, is suggestive of its limitations. He was also the author of a novel called *David Garrick*, and of other fiction. His death occurred in London on February 3, 1871. Consult: *The Principal Dramatic Works of Thomas William Robertson, with Memoir by his Son* (London, 1889); Pemberton, *Life and Writings of T. W. Robertson* (ib., 1893); Cook, *Nights at the Play* (ib., 1883); Clement Scott, *The Drama of Yesterday and To-Day* (ib., 1899).

ROBERTSON, WILLIAM (1721-93). A well-known Scottish historian, born in the parish of Borthwick, Midlothian. Robertson was educated at the University of Edinburgh, and in 1741 he was licensed to preach. In 1746 he was elected to the General Assembly, but he gave most of his time to historical studies. In 1759 he published his celebrated *History of Scotland*, which was an immediate success, and brought the author considerable praise as well as various positions of dignity. The work itself is noted for sobriety and fairness as well as for literary excellence. In 1762 Robertson was made principal of the University of Edinburgh, and in 1763 he was elected moderator of the General Assembly, in which position he displayed great abilities as an administrator. Besides his *History of Scotland* he published in 1769 the *History of the Reign of Charles V.*, which is considered at present to be his best work. In 1777 appeared a *History of America*, and in 1784 a work on the knowledge the ancients had of India. Personally Robertson was a genial man possessing great conversational powers and having a large circle of friends. His writings are elegant and sonorous, but lack naturalness and vigor. All of his histories, however meritorious they were at the time of their publication, have now been superseded. Robertson's works have been published repeatedly, the best edition being in eight volumes (Oxford, 1825). Consult: Stewart, *An Account of the Life and Writings of William Robertson* (Edinburgh, 1801-02); Gleig, *An Account of the Life and*

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Writings of William Robertson (Edinburgh, 1812).

ROBERTSON, WILLIAM H. (1823-98). An American politician, born in Bedford, Westchester County, N. Y. He received an academic education, studied law, and began practice in his native town. His political career began in 1849 with his election as a Whig to the State Assembly. In 1854 he was elected to the State Senate, and in the same year was elected county judge of Westchester County, and remained on the bench until 1866. He allied himself with the Republican Party at its organization, and in 1866 he was elected a member of the Fortieth Congress. From 1872 to 1881 he was again a member of the State Senate. In 1881 his appointment as collector of the port of New York by President Garfield, whose nomination he had been largely instrumental in securing, by leading a part of the New York delegation at the national convention in 1880 to desert the Grant column, caused a serious split in the Republican Party. His nomination, made without consulting the wishes of the two Republican Senators, Roscoe Conkling (q.v.) and Thomas C. Platt (q.v.), was confirmed by the Senate, and led to the resignation of the two Senators from that body. In the bitter struggle between the 'Stalwart' and 'Half-Breed' factions which followed, Robertson was active in the campaign that resulted in the election of new Senators in the place of Conkling and Platt. Judge Robertson held the collectorship until 1885, when he resumed his law practice, and in 1888 was again elected to the State Senate.

ROBERVAL, rô'bâr'vâl', GILLES PERSONNE DE (1602-75). A French mathematician, born at Roberval, whence the name by which he is commonly called. After four years' study in Paris he was appointed professor of philosophy at the Collège Gervais (1631), and in 1633 succeeded Morin in the chair of mathematics at the Collège de France, a position which he retained till his death. He was an eager fighter and quarreled bitterly with Cavalieri, insisting on the priority of his own discovery of the methods of the indivisibles, although he published nothing. Descartes he attacked because his method of constructing tangents appeared about the same time as his own; and with Torricelli he carried on an angry polemic as to which first discovered the method for determining the area of a cycloid. He is best known from the Robervallian lines, which he discovered, curves of infinite length inclosing a finite space. He also occupied himself with mechanics and physics, and is the inventor of a balance bearing his name. He was a member of the Academy of Sciences since its foundation in 1666. Gallois collected his writings and published them in the *Recueil* of the French Academy of Science (1693).

ROBERVAL, JEAN FRANÇOIS DE LA ROQUE, Sieur de (c.1500-?). A French colonist in Canada, born in Picardy, France. After the return of Jacques Cartier (q.v.) from his first voyage, in 1536, Roberval was commissioned by Francis I. to lead an expedition to Canada for the purpose of making new discoveries, and probably of establishing a settlement, he being appointed lieutenant-general and Cartier captain-general. Roberval sailed in April, 1542—Cartier having preceded him by almost a year—arrived at Newfoundland on June 7th, and wintered at Cape Rouge, his followers suffering terribly from starvation and cold. After June, 1543, when he seems to have started for the 'Province of Seguenay,' all authentic record of him is lost. According to Thevet, his friend, he returned to France and was killed in Paris; according to other accounts he died at sea.

ROBESPIERRE, rôb'spê-âr', AUGUSTIN BON JOSEPH (1764-94). The younger brother of Maximilien Robespierre, born at Arras. He was educated at the Collège Louis-le-Grand at Paris, and then began the practice of law at Arras. He embraced the ideas of the French Revolution, and after holding a local office he was elected a member of the National Convention. In general he followed the policy of his brother. As a Deputy on mission he was present at the siege and capture of Toulon, where he recognized the genius of Bonaparte, whom he made one of his intimates. On his return to Paris he tried to influence his brother to milder measures, but finally acquiesced in the sterner policy and voluntarily shared his brother's fortunes on the 9th Thermidor. He was guillotined July 28, 1794.

ROBESPIERRE, MAXIMILIEN MARIE ISIDORE (1758-94). A French Revolutionary leader. He was born at Arras May 6, 1758, the eldest of the four children of Maximilien Barthélemi François de Robespierre and Jacqueline Marguerite Carraut. After some time spent in the college at Arras, Maximilien was given a scholarship by the Bishop of Arras which enabled him to complete his education in the Collège Louis-le-Grand at Paris. His brilliant career as a student gave him a reputation which proved of no little value upon his return to Arras in 1781 to begin the practice of his profession. His patron, the Bishop, appointed him criminal judge of the diocese of Arras in March, 1782, but he soon resigned the place rather than pronounce a death sentence. His literary tastes secured him an election to the Academy of Arras in 1783, and led him to compete, though with slight success, for prizes offered by the provincial academies. That he was reckoned one of the wits and dandies of the town is shown by his membership in a convivial society, the Rosati, of which Carnot was also a member. The summons of the States-General aroused him as it did hundreds of his fellows to political activity. Taking the popular side, he wrote pamphlets, engaged in discussions, and above all took care to look after his own fortunes. He was elected fifth Deputy of the Third Estate of the Province of Artois.

Entering the States-General at the age of thirty-one, he was almost unknown and without a personality that would command attention, so that in the reports of the early sessions the Parisian journalists referred to him simply as 'a Deputy.' Always adopting the popular and radical view, he spoke frequently, with such care in preparation and with such earnestness of manner that he soon overcame the defects of a shrill voice, small stature, pale nervous face, and twitching eyes partly concealed by greenish glasses, which he constantly raised and lowered as he delivered his long and polished periods with measured accents. His former school friend Camille Desmoulins took pleasure in acting as the self-appointed press agent of the brilliant young radical, and the pages of the *Révolutions de France et de Brabant* made the name of Robe-

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spierre familiar throughout France. Mirabeau also noted him and predicted, "That young man believes what he says; he will go far." But until the death of Mirabeau he, like others, was overshadowed by the greatest of the Revolutionists. It was not until May, 1791, that Robespierre began to exercise a real influence. In that month he pronounced his discourse favoring the abolition of the death penalty, and carried his unwise motion excluding from the future Legislative Assembly all members of the Constituent Assembly. During the summer of 1791 he opposed Barnave, Duport, and Lameth in the conservative revision of the Constitution of 1791. During these two years, however, Robespierre's most important activity was not in the Assembly, but in the Jacobin Club. (See JACOBINS.) He set about making himself the acknowledged head of the club, and the leader of the people of Paris. His triumph was made complete when the conservatives were forced to withdraw from the club and organize themselves as the Feuillants (q.v.). His success in winning the Parisian populace to his support was demonstrated on September 30, 1791, at the adjournment of the Constituent Assembly, when he and Pétion were crowned by the people as the true and incorruptible patriots. For a few months he held the office of public prosecutor, which he resigned because of the Girondist attacks. In his defense he started a journal called *Le Défenseur de la Constitution*, continued as *Lettres à mes Commettants* after the opening of the Convention. Still the leading exponent of the radical views, he used his position in the Jacobin Club to antagonize the Girondists, especially in their war policy. Marat was opposing the war as contrary to the interest of the State; Robespierre's grounds were rather humanitarian. Though a demagogue who was daily swaying the people of Paris by his eloquence in the Jacobin Club, he was not a man of action, and remained quiescent while the bolder spirits like Danton and Santerre directed the movement of June 20 and of August 10, 1792, and it was only after the success of the latter day that he appeared at the city hall to take his place as a member of the Insurrectionary Commune. No direct guilt attaches to Robespierre for the great crime of the Parisian mob, the prison massacres of September; still he was at that moment the popular hero and leader, and was a few days later elected as the first Deputy from Paris in the new National Convention.

In the Convention Robespierre was the recognized leader of the radical popular party, now known as the Montagnards, and from the first was denounced by the Girondists as a bloodthirsty demagogue. Of great importance was his famous speech on the King's trial, in which he carefully and clearly stated the logical position of the Convention, and proclaimed: "Louis ought to perish rather than a hundred thousand virtuous citizens; Louis must die, that the country may live." By this speech and by his attitude throughout the trial Robespierre completely outgeneraled the Girondists, whom he forced to take what for them was an illogical position and vote for the execution of the King. His generalship, which took advantage of the mistakes and personal dislikes of the Girondists, also won to his side Danton, Billaud-Varenne, and the other strong men of action. Though the French nation seemed on the point of being destroyed by the foreign foe, the Girondists continued their idle debates, clung to dreams of an impossible federalism, and persisted in their bickerings and their personal attacks upon Robespierre and Danton. Danton and the men of action who had hitherto preferred the company of the Girondists lost patience and were ready to turn to Robespierre, whom they regarded as a fanatic, but not yet dangerous. Taking advantage of these circumstances, Robespierre in one of his characteristic speeches arraigned the Girondists on April 10, 1793. It was a struggle to the death, but its outcome was certain from the moment that Danton and his followers joined Robespierre. The coup d'état of May 31st and June 2d was the work of the men of action, but the victory was that of Robespierre.

Robespierre was not a member of the First Committee of Public Safety and was not one of the original members of the Second or Great Committee of Public Safety, but was chosen to replace Gasparin, who resigned July 27, 1793. With the other members he was continued on the Committee until his arrest exactly one year later on the fateful 9th Thermidor. The name of Robespierre has ever been almost synonymous with the Committee, and both Robespierre and the other members gave currency to the notion that he ran the Committee; but as a matter of fact, the other members were the workers and never allowed Robespierre to interfere with them, and finally overthrew him because he attempted to make his reputed control of the Committee a reality. Virtually the Great Committee of Public Safety (see FRENCH REVOLUTION) was a semi-official Ministry, of which Robespierre was Prime Minister without portfolio. He was the most valuable man on the Committee, for, though he did none of the routine work and rarely appeared at its sessions, he was the one member who was known outside of the Convention and who had a national reputation; he was the ideal patriot, the 'virtuous,' the 'incorruptible;' and under his ægis the steady, clear-headed, industrious men of action toiled quietly, relentlessly, successfully to save France from the foes and perils that beset her. The notion of Robespierre as a bloodthirsty demon who daily breathed forth threatenings and slaughter is a total misconception; the truth is that the Committee was convinced that the only way to accomplish its task of saving France was by a government of terror which should silence or destroy every foe of the nation. To the working members of the Committee like Carnot and Billaud-Varenne the Terror was simply a business affair; to Robespierre it was a necessary preparation for the reign of virtue foreshadowed in the Gospel according to Jean Jacques Rousseau, whose prophet he was. Robespierre was neither the dictator of the Committee nor yet its dupe. He consciously assumed his share of the responsibility for its acts, he defended its policies in set speeches in the Convention and before the Jacobin Club, and he personally carried through the Convention one of the acts which contributed most to make the Terror an orgy of blood: the decree of October 29, 1793, by which after a trial of three days it was made possible for the jury of the Revolutionary Tribunal to declare that they were convinced of the guilt of the accused even though they had not heard the defense.

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Robespierre was the only member of the Committee who had a definite policy for the future, who dared to dream of and plan for better days for France. In personal life and principle a Puritan, in religion a deist, in all things a true believer in Rousseau, this he preached, for this he labored, and in preparation for this he would destroy the vicious. His notions were clarified by his disgust at the follies and mummeries of the Worship of Reason, and by his abhorrence for the members of the Commune of Paris who were the authors of violent and evil measures. At these men, Hébert (q.v.) and his fellows, he would strike the first decisive blow. With the aid of Camille Desmoulins and Danton, who also detested the extravagances of the Hébertists, he was able to send Hébert and eighteen others to the guillotine after a trial that was a parody of justice. Danton, Camille Desmoulins, and the Dantonists were the next victims, because they laughed at the notions of Rousseau, because they saw that the Terror had done its work and that the time had come to exercise clemency, and because Danton was a possible rival to be feared both by Robespierre and by the Committee. On April 5, 1794, Danton perished, a victim of his own greatness, and of the injustice and fanaticism of his enemies—the men who were most indebted to him. After the death of Danton and his friends, the work of destroying the victims went on more rapidly, and after Couthon had carried the outrageous decree of June 10th accelerating the procedure of the Revolutionary Tribunal, 200 victims a week were sacrificed to the guillotine. In the meantime Robespierre was busy inaugurating his reign of virtue by instituting the Worship of the Supreme Being. On May 7th he delivered his famous speech in the Convention on the relation of religion and morality to republican principles, after which the Convention decreed a festival of the Supreme Being, which took place on June 8th with Robespierre, then president of the Convention, acting as the pontiff of the new religion.

One more hecatomb of victims would clear away the remaining leaders who stood in the way of the reign of virtue. At these, some of whom were his associates in the Committee or in the Convention, Robespierre planned to strike. But it was one dreamer against twenty men of action, and the dreamer failed. After a prolonged absence from the Convention and the Committee, Robespierre appeared in the Convention on July 26, 1794, and delivered one of his carefully prepared speeches intended to preface and justify the destruction of his foes. The next day Saint-Just, his fearless and vigorous supporter, appeared in the tribune to secure the passage of the measure of proscription. Stormy scenes followed, but at last the intended victims, Barras, Tallien, and the men of action from the Committee, with the skillful aid of Barère (q.v.), secured the arrest of Robespierre, and his younger brother Augustin, Couthon, Saint-Just, and Le Bas. All was not over, however, for Henriot with the National Guards of Paris rescued Robespierre and his friends and installed them at the City Hall. Had Robespierre been able to decide quickly and act quickly, he might still have won; but indecision and inactivity gave his foes time to act and to attack him in the City Hall. In the affray Robespierre shot himself or was shot in the jaw, his brother leaped from the window and broke his leg, and Le Bas committed suicide. The Convention reassembled and declared Robespierre and his friends and Henriot and the members of the Commune of Paris outlaws. This was the famous Revolution of the 9th Thermidor. On the next day these men were all brought before the Revolutionary Tribunal and identified and immediately guillotined.

Robespierre's private character was above reproach; his manners, dress, and tastes were those of a gentleman of the Ancien Régime; his oratory depended for its success upon his elaborately finished style, upon his logic, and above all upon his earnestness; on several occasions he manifested a political ability of no mean order. Equipped as a philosopher of the Ancien Régime, he came upon the field after the day of philosophizing had passed and when the day of action had dawned. For this reason he failed and in his fall dragged a multitude to destruction.

BIBLIOGRAPHY. Hamel, *Histoire de Robespierre* (Paris, 1865-67), is the authoritative work, though inclined to be eulogistic. Aulard, *Les orateurs de la législative et de la convention* (Paris, 1885-86), deals with Robespierre as an orator, while his most important speeches are published in Morse-Stephens, *Principal Speeches of the Orators and Statesmen of the French Revolution* (Oxford, 1892). Consult, also, Belloc, *Robespierre* (London, 1902).

ROBIN (originally a quasi-proper name), or ROBIN REDBREAST. A name given affectionately in the first instance to a familiar little European song-bird, which especially endears itself to the people by coming around the house and barns in winter; and later applied to the most common and familiar of American thrushes, because of its friendly association with man, and its red breast. The European robin is technically a warbler, of the family Sylviidæ. It is about 5.57 inches in length, and of a remarkably round, plump form. (See Plate of WRENS, WARBLERS, etc.) The general color is olive-brown, and the reddish-orange breast is a conspicuous characteristic, particularly of the male. The redbreast is a native not only of Europe but of the western temperate parts of Asia and of Northern Africa. In the northern parts of Europe it is migratory, but never congregates in flocks. The attachment of pairs seems to extend beyond the mere breeding season (early spring), and to be stronger than in most birds. The nest is made of moss, dead leaves, and dried grass, lined with hair, often placed a little above the ground in a bush or in ivy on a wall; the eggs, 5 to 7 in number, are white spotted with pale reddish brown. In winter the redbreast seeks the neighborhood of human habitations more than in summer, and becomes more bold and familiar. Its food ordinarily consists of worms, insects, and berries; and it readily becomes a pensioner at any door or window to which it is invited by the spreading of crumbs.

The American robin (*Merula migratoria*) is the largest and most numerous of our thrushes, and closely related to the European blackbird (q.v.). It is 10 inches long, olive-gray, the top and sides of the head black, the chin and throat white with black streaks, and the under parts orange. The female is of duller hues. Large flocks are to be seen in the Southern States in winter, where great numbers are killed for the

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table. The robin is a lively bird and a general favorite. The nest is built in trees or on rafters, stumps, or fence-posts, of coarse grass and reeds, plastered internally with mud and lined with fine grasses. The eggs are 4 to 5 in number, uniform greenish-blue. Two broods are produced in a year. Its food consists chiefly of worms and insects, but it enjoys berries and fruit, and often makes sad havoc among cherries. The song of the robin, especially in the late afternoon or early evening, is very sweet and melodious, and it is a familiar friend on village lawns, where it searches for earthworms and cutworms with great zeal and cunning. A closely allied robin is found in Lower California, known as the Saint Lucas robin (*Merula confinis*). It is much paler and a trifle smaller than the common robin. The Oregon robin (*Hesperocichla nævia*) is a nearly allied species, called in books the varied thrush. The under parts are orange-brown, but there is a broad black band across the breast. This species is abundant in the Pacific Coast region from Alaska to Mexico.

ROB'IN ADAIR', called AILEEN AROON, or EILEEN AROON. A song based on the old Irish melody "Eileen Aroon," which dates back to the fifteenth or sixteenth century. The air has been repeatedly claimed by the Scotch and the Welsh, but is undeniably of Irish origin. Boieldieu introduced it into his *Dame Blanche*, and Beethoven arranged it for voices with pianoforte, violin, and violoncello (op. 108). Many songs were written to the old air, including Burns's "Phillis the Fair," "Had I a Cave," and Moore's "Erin, the Smile and the Tear in Thine Eye."

ROBIN GOOD'FELLOW. A supernatural being belonging to English folklore and mentioned by Shakespeare and his contemporaries. According to *A Midsummer Night's Dream* Robin is described as zealous in performance of household tasks for the sake of favorites, but inclined to play tricks on those with whom he is offended, or merely for his own diversion. He is said to take numerous shapes, into which he changes himself at will. He can also appear as a fire, and in this latter aspect is identical with the imaginary being called Will o' the Wisp, or Jack o' Lantern. He is further identified with the fairy Puck, originally a term applied to elves in general. The conduct ascribed to Robin is not so much peculiar to his individuality as common to a class of similar spirits connected with the household, who were supposed to assist in domestic labors, such as cleaning the habitation, spinning, and weaving, and who received a sort of worship, being regularly provided with sacrificial offerings of food.

ROBIN HOOD. A legendary English outlaw. See HOOD, ROBIN.

ROB'INS, BENJAMIN (1707-51). An English mathematician and military engineer, born at Bath. In 1728 he confuted a dissertation by Jean Bernoulli, which attempted to establish Leibnitz's theory on the laws of motion, a victory which gained him considerable reputation. For some years he taught pure and applied mathematics, but later became an engineer, devoting himself to the construction of mills and bridges, and commenced the series of experiments on the resisting force of the air to projectiles, which has gained him much celebrity. In 1734 he demolished, in a treatise entitled *A Discourse Concerning the Certainty of Sir Isaac Newton's Method of Fluxions*, the objections brought by Bishop Berkeley against Newton's principle of ultimate ratios. His valuable work, *New Principles of Gunnery* (1742), produced a complete revolution in the art of gunnery. In this Robins suggested two new methods for estimating the velocity of balls. He also discovered and explained the curvilinear deflection of a ball from a vertical plane. He wrote several dissertations on the experiments and was in 1747 awarded the Copley medal. In 1749 he was appointed engineer-in-general to the East India Company and planned the defenses of Madras. His mathematical works were collected after his death, and along with the details of his latest experiments in gunnery were published under the title, *Mathematical Tracts* (1761). Robins also revised and edited Anson's *Voyage Round the World* (1740-44), and contributed extensively to the *Transactions* of the Royal Society.

ROBIN SNIPE. A gunner's name locally applied to various red-breast shore birds, especially to the dowitchers (q.v.). See Plate of BEACH BIRDS.

ROB'INSON, AGNES MARY FRANCES (Mme. DUCLAUX, formerly Mme. DARMESTETER) (1857—). An English poet and essayist, born at Leamington, February 27, 1857. She studied at University College for seven years, devoting herself specially to Greek literature. In 1888 she married James Darmesteter, the Orientalist, remaining in Paris after his death in 1894. In 1901 she married Professor Duclaux, director of the Pasteur Institute. Among her works are: *A Handful of Honeysuckles* (1878); *The Crowned Hippolytus*, translation of Euripides (1881); *Arden*, a novel (1883); *Emily Brontë* (1883); *The New Arcadia* (1884); *An Italian Garden* (1886); *Songs, Ballads, and a Garden Play* (1888); *End of the Middle Ages* (1888); *Retrospect* (1893); *A Mediæval Garland* (1897); *Froissart*, in the "Grands écrivains français" series (1897); *Life of Renan* (1897; in French, 1898); *La Reine de Navarre* (1900); *Grands écrivains d'outremanche* (1901). Much of her work is scattered through the *Revue de Paris* from 1898 onward.

ROBINSON, BENJAMIN LINCOLN (1864—). An American botanist, born at Bloomington, Ill. He graduated at Harvard in 1887, and studied at Strassburg and Bonn. In 1892 he was appointed curator of the Gray Herbarium at Harvard, and in 1900 became Asa Gray professor of systematic botany there. He is best known for his work of classification and as collaborator and editor of Gray's *Synoptical Flora of North America* (1878-97).

ROBINSON, BEVERLEY (1723-92). An American Loyalist, born in Virginia. He was the son of John Robinson, president of the Council of Virginia in 1734. He served as major under Wolfe at Quebec in 1759, and soon afterwards gained possession, through marriage with a daughter of Frederick Philipse, of large tracts of land in New York. At first he sided with the colonists against England, but, disapproving of the separation, he removed to New York in 1776 and organized the Loyal American Regiment, of which he became colonel. Later his property, together with that of his wife, was confiscated

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by the State of New York. His country house was the scene of Arnold's preliminary arrangements for the surrender of West Point, Robinson himself being implicated in the plot. After the war he retired, first to New Brunswick and later to Thornbury, Eng., where he lived until his death.

ROBINSON, CHARLES (1818-94). The first Governor of the State of Kansas. He was born in Hardwick, Mass., studied for a time in Amherst College, and in 1843 graduated at the Berkshire Medical School. Six years later he accompanied an emigrant train across the plains to California. He settled in Sacramento, and remained there for two years working as a miner, as a restaurant keeper, and as editor of the *Settler's and Miner's Tribune*. In 1850 he was elected to the Legislature, in which he proved an able champion of the settlers, and also did much to prevent California from becoming a slave State. Returning to Massachusetts, he edited the Fitchburg *News* for two years, and in 1854 was chosen by the Emigrant's Aid Society to go to Kansas and help save that Territory for freedom. He quickly became the leader of the Free-State Party, and was made chairman of the Executive Committee and commander of the Kansas Volunteers. It was his policy to avoid any resistance to the United States Government, but to ignore the laws passed by the bogus pro-slavery Legislature of 1855. He took an active part in the 'Wakarusa War,' and in 1855 was a member of the Topeka Convention which drew up a free-State constitution. In the following year he was elected Governor under this Constitution, but was arrested on a charge of treason and usurpation of office. He was indicted by the Federal Grand Jury, but after an imprisonment of several months he was tried for usurpation, and, being acquitted, was released. Two years later he was reëlected Governor by the Free-State Party; in 1859 he was again reëlected under the Wyandotte Constitution, and in 1861 he became the first Governor of the State. He bequeathed most of his property to his wife, but stipulated that on her death it should go to the Kansas State University, which owes its existence very largely to their efforts. He published *The Kansas Conflict* (New York, 1892). Consult: Blackmar, *Charles Robinson* (Topeka, 1900); Spring, *Kansas* (Boston, 1885), in the "American Commonwealth" series.

ROBINSON, CHARLES SEYMOUR (1829-99). An American clergyman, born at Bennington, Vt. He studied at Williams College and at the Union Seminary, but completed his theological studies at Princeton in 1855. For five years thereafter he preached at the Park Presbyterian Church at Troy, N. Y., then removed to the First Presbyterian Church in Brooklyn and remained until 1868, when he took charge of the American chapel in Paris, which, during his term, he converted from a preaching station into an organized church. At the opening of the Franco-German War he left Paris, but returned for a few months following the suppression of the Commune in 1871 to reorganize what remained of the congregation. Returning to America, he served successively the Madison Avenue and the Thirteenth Street Presbyterian churches, New York. His works are chiefly of a religious character, though his travel and study in Egypt give an archæological interest to *The Pharaohs of the Bondage and the Exodus* (1887). It is as an editor of hymn collections that he is known outside his church connections. His successive hymnals, *Songs of the Church* (1862), *Songs for the Sanctuary* (1865), *Psalms, Hymns, and Spiritual Songs* (1874), and *Laudes Domini* (1884), have been widely used.

ROBINSON, EDWARD (1794-1863). An American biblical scholar, born at Southington, Conn. He graduated at Hamilton College, Clinton, N. Y., in 1816. Later he studied at Andover, Mass., and at Halle and Berlin. On his return to the United States he was made professor extraordinary of sacred literature at Andover; but in 1833 his health broke down and he moved to Boston, where he remained until 1837, when he was appointed professor of biblical literature in Union Theological Seminary. This office he continued to hold until his death. He twice traveled in Palestine, in 1838 and again in 1852, with the famous missionary the Reverend Eli Smith. The result of their first visit was published in a work entitled *Biblical Researches in Palestine and Adjacent Countries* (3 vols., Boston and London, 1841; German ed., Halle, 1841). The work was republished in 1856 with some additions after the second visit. He edited and translated *Buttmann's Greek Grammar* (1823; 3d ed. 1851); *Gesenius' Hebrew Lexicon* (1836; 5th ed. 1854); *Greek and English Lexicon of the New Testament* (1836; 2d ed. 1847); *Greek Harmony of the Gospels* (1845; 2d ed. 1851); *English Harmony of the Gospels* (1846). He founded the *Biblical Repository* in 1831 and edited it for four years. In 1843 he established the *Bibliotheca Sacra*. Consult Hitchcock, *The Life, Writings, and Character of Edward Robinson* (New York, 1863).

ROBINSON, EZEKIEL GILMAN (1815-94). An American clergyman and educator, born at Attleboro, Mass., and educated at Brown University and at Newton Theological Seminary. After his ordination he preached at Norfolk, Va., until 1845, when he removed to Cambridge, Mass., but soon relinquished the active ministry and accepted the chair of Hebrew and biblical interpretation in the Western Theological Seminary at Covington, Ky. In 1850 he became pastor of the Ninth Street Baptist Church, Cincinnati, but three years later was appointed professor of theology in Rochester Theological Seminary and in 1860 was made its president. After twelve years of service he was called to the presidency of Brown University. In 1889 he retired from this post on account of age and impaired health. In 1893 he became professor of ethics and apologetics in Chicago University and continued there until his death. His eminence as a preacher and thinker placed him among the foremost in his denomination. During his residence at Rochester he edited the *Christian Review* from 1859 to 1864. He also published a revision of the English translation of Neander's *Planting and Training of the Christian Church* (1865); *Yale Lectures on Preaching* (1883); and a text-book on ethics, *Principles and Practice of Morality* (1888).

ROBINSON, Sir FREDERICK PHILIPSE (1763-1852). An English general, son of the loyalist Beverley Robinson, born at Philipse Manor, near

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New York City. In 1777 he entered his father's Loyal Regiment, fought at Horseneck and at Stony Point, where, in July, 1779, he was taken prisoner, was released in November, 1780, and in September, 1781, was present at the capture of New London. At the close of the Revolution his property was confiscated and he went to England. Robinson saw service in the West Indies in 1794, becoming a major in September of that year, and in 1812, against Wellington's wishes, was sent with the rank of colonel to the Peninsula, where he commanded a brigade and distinguished himself by intrepid bravery at Vitoria and San Sebastian and at the Nive, being several times wounded. In 1814 he was promoted to the rank of major-general, and he was sent in the same year to Canada with a brigade. He took part in the attack on Plattsburg and bitterly resented General Prevost's order to retire. He was knighted in 1815, and for a few weeks in that year acted as provincial Governor of Upper Canada, whence in 1816 he was transferred to the West Indies. Robinson became general in 1841.

ROBINSON, Henry Crabb (1775-1867). An English man of letters. He was born at Bury Saint Edmunds, and was early apprenticed to a lawyer in London. He studied on the Continent, acquired a thorough knowledge of German philosophy and literature, and made the acquaintance of Schiller, Goethe, Wieland, and others. In 1808 he became special Spanish correspondent of the London *Times*, of which he subsequently became a regular editorial writer and literary critic. Among his literary friends were Wordsworth, Lamb, Coleridge, Southey, Flaxman, Clarkson, and Charles G. Loring, a leader of the Boston bar. He was a brilliant conversationalist and raconteur. Brief selections from his *Diary* and *Correspondence* were published by Sadler (1869). He was a liberal patron of art and education, was one of the first members of the Athenæum Club, and was one of the founders of the Flaxman Gallery and of the University College, London.

ROBINSON, Sir Hercules George Robert, Baron Rosmead (1824-97). A British colonial Governor. He was educated at Sandhurst, and soon left the army for office in the Irish Board of Public Works, where he proved an able administrator during the famine of 1846. In 1855 he left Montserrat to become Governor of Saint Christopher, and five years afterwards was knighted for the introduction of coolie labor, and transferred to Hong Kong. Afterwards he was appointed Governor of Ceylon (1865), of New South Wales (1872), and of New Zealand (1879); in 1880 he succeeded Sir Bartle Frere as High Commissioner of South Africa, a post which he held until 1889. His policy was strongly in favor of responsible colonial government, and the success of his first administration was evidenced by his reappointment in 1895. But he broke openly with Cecil Rhodes at the time of the Jameson raid, and in his anxiety to arrange the release of the raiders refused Chamberlain's order to settle immediately the status of the Uitlanders. His influence probably postponed the outbreak of hostilities. Robinson became Baron Rosmead a year before his death.

ROBINSON, James Harvey (1863—). An American historian, born at Bloomington, Ill. He graduated at Harvard in 1887, took post-graduate courses there and at Freiburg, and in 1891 became lecturer on European history at the University of Pennsylvania. Four years afterwards he was chosen professor of history at Columbia, but still kept up his connection with the University of Pennsylvania's *Translations and Reprints from the Original Sources of European History*, in which he edited papers on French history under Napoleon, and in the period following, and on German constitutional and religious history. With Rolfe he published, in 1898, *Petrarch, the First Modern Scholar and Man of Letters*. For the year 1900-01 Robinson was acting president of Barnard College.

ROBINSON, John (c.1576-1625). The minister of the Pilgrim Fathers. He was born probably in Gainsborough, Lincolnshire, England, and was educated at Corpus Christi College, Cambridge. He took orders in the Church of England, and worked near Norwich, but was suspended for non-conformity by the Bishop about 1603. He became a Separatist soon after and united himself with a congregation at Scrooby. After several unsuccessful attempts to emigrate this congregation reached Amsterdam between April and August, 1608. Here Robinson was chosen pastor. They removed to Leyden, reaching there in May, 1609. Robinson bought a large house, together with three friends, and lived as pastor of a growing Separatist congregation. He carried on many controversies with Anglican and Puritan opponents, and exerted a strong influence over the English exiles in Amsterdam. The prosperity of the congregation was pronounced, but Robinson foresaw that there was no final hope of permanence for his Church in Holland. Therefore, together with Cushman, Bradford, Brewster, and others, he organized a movement to emigrate to America, which was consummated by the removal of the majority of the stronger members to Plymouth in 1620. Robinson remained behind with the weaker and older members, hoping to follow the majority in time. He was hindered, chiefly by the financial supporters of the movement in England, who feared his principles of separation. He died in Leyden and was buried March 4, 1625, in Peter's Church. Robinson was one of the strongest champions of the Separation from the Church of England, a movement which grew into the system of Independency and Congregationalism. He was a man of such personal force that he could master the tendencies to disintegration in the movement and build the ideal into a stable institution. He is truly regarded as the founder of Congregationalism. The location of the house in which he lived in Leyden is marked by a tablet and a beautiful bronze memorial is affixed to Peter's Church, where he is buried. His works were collected and published in three volumes with an introductory biographical study, by Robert Ashton (London and Boston, 1851). His most important publications were: *A Justification of Separation from the Church of England* (1610); *Of Religious Communion* (1614); and *Essays* or *Observations Divine and Moral* (1625; several subsequent editions). Consult the biography by Davis (Boston, 1903).

ROBINSON, Sir John Charles (1824—). An English art critic, born in Nottingham. He

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was educated in his native city and studied art in Paris under Drolling. In 1847 he was made headmaster of the Government School of Art at Hanley, and in 1852-69 he was superintendent of the art collections of the Victoria and Albert Museum. During this time he carried out a system of loan exhibitions from the main museum through the provincial museums, and collected many of the art treasures of the institution. From 1882 until 1901 he was Her Majesty's Surveyor of Pictures. His works include: *Descriptive Catalogue of the Drawings of the Old Masters in the Collection of Malcolm of Poltallock* (1869); *A Critical Account of the Drawings of Michael Angelo and Raffaelle in the University Galleries* (1870); and *Memoranda on the Madonna dei Candelabri of Raffaele* (1878).

ROBINSON, JOHN CLEVELAND (1817-97). An American soldier, born in Binghamton, N. Y. He graduated at West Point in 1839, and served with distinction under Generals Taylor and Scott in the Mexican War. In 1853 and 1854 he served against the Indians in Texas, and in 1857 and 1858 was with the expedition sent out to Utah against the Mormons. When the Civil War broke out, he was in command of Fort McHenry at Baltimore, and prevented it from being seized by Confederate sympathizers. Afterwards he was engaged in the work of mustering in troops at Columbus, Ohio, and Detroit, Mich., and in September, 1861, became colonel of the First Michigan Volunteers. In the following April he was promoted to be brigadier-general, commanded a brigade at Newport News, and then was made a brigade commander in Kearny's division of the Army of the Potomac. He fought with that army in the Peninsular campaign, at Fredericksburg, Chancellorsville, Gettysburg, and in the battles of the Wilderness. At Spottsylvania Court House, while leading a charge of his division, he received a wound which necessitated the amputation of his left leg and thus incapacitated him from further service in the field. In 1872 he was elected Lieutenant-Governor of New York. In 1877 and again in 1878 he was chosen commander-in-chief of the Grand Army of the Republic, and in 1887 he was made president of the Society of the Army of the Potomac.

ROBINSON, LUCIUS (1810-91). An American political leader, born at Windham, N. Y. He received an academic education, and was admitted to the bar in 1832. In 1840 he removed to New York City, but in 1855 he gave up his law practice and retired to a farm in Chemung County. In 1859 as the Republican candidate, but with Democratic aid, he was elected to the State Assembly, and in the following year was reelected. In 1861 he was elected State Comptroller on the Union Combination ticket by an unprecedented majority, and in 1863 was reëlected. Ten years later he was again elected Comptroller, this time on the Democratic ticket, but he resigned the next year to accept the office of Governor. In 1879 he was renominated for Governor by the Democratic Party, but, owing to the hostility of Tammany Hall, was defeated.

ROBINSON, ROBERT (1735-90). An English preacher and hymn-writer, born at Swaffham, in Norfolk. After attending two grammar schools, he was apprenticed (1749) to a London hairdresser. He continued his education by himself; and, coming under the influence of Whitefield, he began to preach. In 1761 he became minister at the Stone Yard Baptist Chapel in Cambridge, built a new church (1764), and drew large congregations. He lived at different villages in the neighborhood, where he augmented his small stipend by farming and by trade in corn and coal. Though nominally a Baptist, Robinson was very liberal in his religious views; he became in fact a Unitarian. Robinson was a bold and racy preacher and writer. Among his works are: *A Plea for the Divinity of Our Lord* (1776), the arguments of which he afterwards regarded as untenable; a translation from the French of Jacques Saurin's *Sermons* (two sermons, 1770; 5 vols., 1784); a translation of Jean Claude's *Essay on the Composition of a Sermon* (1778-79); *A History of Baptism* (ed. by George Dyer, 1790); and many other miscellaneous pamphlets on theological questions and the slave trade. He also wrote several hymns, of which two are of great beauty: "Come Thou Fount of Every Blessing" and "Mighty God, while Angels Bless Thee." Consult: *Memoirs of Life and Writings*, by Dyer (London, 1796); and *Miscellaneous Works*, ed., with memoir, by Flower (Harlow, 1807).

ROBINSON, STUART (1814-81). A clergyman of the Presbyterian Church. He was born at Strabane, near Londonderry, Ireland, came to America, and was graduated at Amherst College in 1836. He studied at the Union Theological Seminary, Prince Edward, Va., and at Princeton Seminary before taking up his pastorate at Kanawha Salines, W. Va., in 1841. From here he removed to Frankfort, Ky., then to Baltimore, and in 1856 became professor of Church polity and pastoral theology in the Presbyterian Theological Seminary at Danville, Ky. In 1858 he assumed the pastorate of the Second Presbyterian Church in Louisville, Ky., and edited *The True Presbyterian*, a paper which was suppressed by the military authorities on the charge of the disloyalty of its editor, who thereupon removed to Toronto and remained there until the close of the war. In 1866 he was expelled from the General Assembly meeting in Saint Louis, as a member of the Louisville Synod that had adopted the 'Declaration and Testimony,' a paper protesting against the political deliverances of the five preceding General Assemblies as 'unwise, unconstitutional, and unscriptural.' In 1869 the Synod of Kentucky under his lead united with the General Assembly of the Southern Presbyterian Church and chose him their moderator. Later he was prominent in framing the constitution and promoting the success of the General Presbyterian Alliance. He published: *Slavery as Recognized in the Mosaic Civil Law, and as Recognized also and Allowed in the Abrahamic, Mosaic, and Christian Church* (1865), and *Discourses of Redemption* (1866).

ROBINSON, THEODORE (1852-96). An American landscape painter of the Impressionist School, born at Irasburg, Vt. He studied under Carolus Duran and Gérôme in Paris, and afterwards at Giverney with the Impressionist Monet. Upon his final return to America he devoted himself with great success to Delaware and Hudson River Canal scenery. Robinson was one of the foremost representatives of the Impressionist School (q.v.) in America, but such was the effect of his early training that he rendered form in a way easy to understand. His works are mostly in private

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possession. Among the best known are: "A Bridge," "In the Sunlight" (1892), Grand Union Hotel, New York; "Washing Day," "On the Tow-Path," and "Afternoon Shadows" (1894); "West River Valley," and "October Afternoon," exhibited at the National Academy (1896). Robinson died in New York City, April 2, 1896.

ROBINSON, THERESE ALBERTINE LUISE (pen-name TALVI, composed from the initials of her maiden name) (1797-1870). A cosmopolitan authoress, daughter of Prof. Ludwig H. von Jakob. She was born at Halle, Germany, lived for a time with her father in Russia; married (1828) Prof. Edward Robinson (q.v.), the American biblical scholar; accompanied him to the United States, where she studied the languages of the aborigines. Mrs. Robinson wrote extensively both in English and in German. Among her publications are German translations (under the signature Ernest Berthold) of Scott's *Black Dwarf* and *Old Mortality* (1822); *Psyche*, a volume of tales (1824); a German translation of Servian folk-songs (1825-26); *Charakteristik der Volkslieder germanischer Nationen* (1840); *Die Unechtheit der Lieder Ossians* (1840); *Die Colonisation von Neu-England* (1847); tales in German—*Heloise*, *Life's Discipline*, and *The Exiles*, translated into English by her daughter (1850-53); a volume of reviews, entitled *Historical View of the Languages and Literature of the Slavic Nations* (1850); *Fifteen Years, a Picture of the Last Century* (1870). Her *Gesammelte Novellen* appeared in two volumes in 1874.

ROBINSON, WILLIAM CALLYHAN (1834—). An American lawyer and educator, born in Norwich, Conn. He graduated at Dartmouth in 1854, and at the General Theological Seminary, New York City, in 1857, and was admitted to the bar in 1864. For some time he was lecturer and professor of law in Yale University. In 1895 he was elected dean of the law schools of the Catholic University of America, Washington, D. C. While practicing law in New Haven he had been judge of the City Court (1869-71), judge of the Court of Common Pleas (1874-76), and a member of the Legislature of Connecticut. His works include: *Elementary Law* (1882), a widely used text-book; *Law of Patents* (1890); and *Elements of American Jurisprudence* (1900).

ROBINSON, WILLIAM ERIGENA (1814-92). An Irish-American journalist and politician, born in Unagh, County Tyrone, Ireland. After obtaining a classical education, he emigrated to the United States. He graduated at Yale in 1841, then became associate editor of the New York *Tribune*, and from 1844 to 1848 was its Washington correspondent, writing under the nom-de-plume of 'Richelieu.' He subsequently edited several other papers, and from 1854 to 1862 practiced law in New York. In the latter year President Lincoln appointed him assessor of internal revenue for the Third New York District, and after holding this office for four years, he was in 1866 elected to Congress, where by his determined advocacy he secured the passage in 1868 of a bill protecting abroad the rights of naturalized as well as native-born citizens. Previous to this (1847) he had taken an important part in organizing a movement for the relief of Ireland, during the great Irish famine, and had secured the passage of the bill sending the United States warship *Macedonian* with provisions to his native land. He was reëlected to Congress in 1880 and 1882.

ROBINSON CRUSOE. A romance by Daniel Defoe (1719), founded on the actual adventures of Alexander Selkirk during his four years' residence in the island of Juan Fernandez. It is one of the most famous and at the same time most plausible of all stories of adventure, has been translated into several languages, and has enjoyed an undiminished popularity. For special study, the reprint edited by Austin Dobson (London, 1883), with a bibliography, may be mentioned.

ROB ROY. The popular name of Robert MacGregor or Campbell (1671-1734), a celebrated Scottish outlaw. He was born in Buchanan Parish, Stirlingshire, and was the second son of Donald MacGregor of Glengyle, by a daughter of Campbell of Glenneaves. In Gaelic, the name *Roy* signifies red, and was applied to him from his ruddy complexion and color of hair. Rob Roy assumed the maternal name of Campbell in consequence of the outlawry of the clan MacGregor by the Scottish Parliament. He received a fair education and in his youth was distinguished for his skill in the use of the broadsword, in which the uncommon length of his arms was of much advantage. Like many of the Highland proprietors of the period, he was engaged in grazing and rearing black cattle for the English market, but his herds were so often stolen by raiders that, to protect himself, he maintained a party of armed men, also protecting his neighbors' flocks, in return for which he levied a tax which went under the name of 'black mail.' By marriage he acquired the estates of Craig Royston and Inversnaid, near the head of Loch Lomond. In consequence of losses incurred in unsuccessful speculations in cattle, for which he had borrowed money from the Duke of Montrose, his estates were seized by the Duke. Rendered desperate by his misfortunes, Rob Roy collected a band of about 20 followers, and made open war upon the Duke, sweeping away all the cattle of a district, and intercepting the rents of his tenants notwithstanding the vicinity of the garrisons of Stirling, Dumbarton, and Glasgow. His exploits have been immortalized by Sir Walter Scott in his novel *Rob Roy*, written in 1817. In 1722 he submitted to the authorities, and was imprisoned in Newgate, and in 1727 was sentenced to transportation to Barbadoes, but was reprieved. He retired to Balquhidder, where he died.

ROB'SART, AMY. A character in Scott's *Kenilworth*, secretly married to the Earl of Leicester. All was about to be revealed to Elizabeth during the revels at Kenilworth, when Amy was lured back to Cumnor Place, by Varney, the Earl's accomplice, and was killed by falling through a trap-door.

ROB'SON, STUART (1836-1903). An American comedian. He was born at Annapolis, Md., his real name being Robson Stuart. He made his début at the Baltimore Museum in 1852, but though his part then was serious, his voice and manner unintentionally made it laughable, and he wisely determined to devote himself to comedy, in which he quickly met with success. His Captain Crosstree in the burlesque of *Black-Eyed Susan* is one of his best-remembered characters. In 1877 he made a hit in *Our Boarding House*

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with W. H. Crane (q.v.) and the two established a partnership which lasted till 1889. They successfully revived several of Shakespeare's comedies, but their most popular production was Bronson Howard's play *The Henrietta* (1888-89). After parting with Crane, Robson starred in *The Henrietta, She Stoops to Conquer, The Meddler,* and other pieces. He died April 29, 1903. Consult: McKay and Wingate, *Famous American Actors of To-Day* (New York, 1896); Strang, *Famous Actors of the Day in America* (Boston, 1900).

ROBUSTI, rô-bus'tê, JACOPO. See TINTORETTO.

RO'BY, HENRY JOHN (1830—). An English educator, born at Tamworth. He was educated at Bridgworth, and Saint John's College, Cambridge, where after his graduation he was tutor and lecturer from 1853 until 1861. There he published *Remarks on College Reform* (1858). Afterwards he was master at Dulwich College for four years, and from 1866 until 1868 he was professor of jurisprudence at University College, London. In 1890-95 he was a member of Parliament from Eccles. His works include a *Grammar of Latin Language* (1871-74) and an *Introduction to Justinian's Digest* (1884), a very valuable work.

ROC (Ar. *rukhkh,* from Pers. *rukh,* hero, rhinoceros, roc). A marvelous bird of Arabic legend. It was so large that it could easily carry off elephants, and Sindbad the Sailor records his coming upon the egg of the bird, measuring 50 paces in circumference. The home of the monster was localized in Madagascar, and this gives a clue to one of the roots of the tradition. That island was the home of a large prehistoric bird (the Æpyornis, q.v.), of which fossil eggs have been discovered, measuring 13 inches in length. In the Babylonian mythology the storm-god Zu was represented in the form of a bird, the idea arising from the bird-like masses of clouds gathering at the storm. Like traditions of such a cosmical bird are to be found in Indian, East Indian, Persian, and Egyptian mythology. Consult: Yule's notes to his *Marco Polo* (London, 1871); and Lane's *Arabian Nights* (ib., 1838-40).

RO'CA, JULIO A. (1843—). A South American statesman, President of Argentina. He was born at Tucuman. In 1880 he was elected to the Presidency by the Federalist Party, but had to terrorize Buenos Ayres and Corrientes before he could enter on his administration, in which the currency was debased and the national debt greatly increased. He was succeeded by his brother-in-law, Juarez Celman (q.v.), in 1886, who was soon displaced by Pellegrini, and under this reformer Roca held a Cabinet post. In 1895 he became Vice-President and at the next election was chosen President for the term 1898-1904.

ROCAMBOLE (*Allium scorodoprasum*). A North European plant closely related to, larger than, and resembling garlic in habit, like which it is sometimes cultivated and used.

ROCH, rôk, SAINT (c.1295-c.1327). A popular saint of the French Church, the patron of those sick of the plague, and specially honored by physicians and hospitals. He was born of noble family at Montpellier. He undertook a pilgrimage to Rome at a time when pestilence was raging in Italy and devoted himself to the care of the sick in different places. At Piacenza he was himself smitten and dragged himself to a neighboring forest, where a dog is said to have brought him food daily till his recovery. He returned to Montpellier, where he was thrown into prison as a spy, and died about 1327. His day is August 16th.

ROCHAMBEAU, rô'shäN'bô', JEAN BAPTISTE DONATIEN DE VIMEUR, Count de (1725-1807). A French soldier, born July 1, 1725, at Vendôme, where his father, a general in the French Army, was Governor. He was educated for the Church at Blois, but in 1742 became a cornet in the army. He distinguished himself in the War of the Austrian Succession, and at its close had attained the rank of colonel. In 1749 he succeeded his father as Governor of Vendôme. He commanded his regiment in the Minorca Expedition of 1756, distinguished himself in the capture of Port Mahon, was promoted to the rank of brigadier-general, and served with credit in the campaigns of the Seven Years' War in Germany. In 1769 he became inspector-general of the French Army and in 1780 lieutenant-general. In the latter year he was sent at the head of 6000 French regulars to coöperate with Washington against the English in America, and landed at Newport on July 10th. The French fleet under De Ternay, which had accompanied Rochambeau's army, was soon afterwards blockaded in Narragansett Bay, and Rochambeau, unwilling to abandon De Ternay, was kept inactive in Rhode Island for an entire year. Rochambeau's forces left Rhode Island in July, 1781, marched across Connecticut, and joined Washington on the Hudson. On August 19th the combined forces began their famous southward march to Yorktown, where they joined Lafayette's little army by September 18th. On October 19th Cornwallis was forced to surrender. During the entire campaign Rochambeau placed himself wholly under Washington's command, and, according to his instructions, acted as though his troops were simply a part of the American army. In recognition of their services Congress voted the thanks of the nation to Rochambeau and his troops. Returning to France early in 1783, Rochambeau was appointed Governor of Picardy and Artois, and in 1791 was made a marshal. He was in sympathy with the Revolutionary movement in France at the outset, and for a time was commander of the Northern Army, but the excesses of the Revolutionary leaders caused him to retire in disgust in July, 1792. He was imprisoned during the Reign of Terror, and only escaped the guillotine by the fall of Robespierre in 1794. Subsequently he was released and was restored by Napoleon to his rank and estates. He died at Thové, May 10, 1807. He published *Mémoires militaires, historiques et politiques de Rochambeau* (Paris, 1809). A part of the first volume, translated into English by M. W. E. Wright, was published under the title *Memoirs of the Marshal Count de Rochambeau Relative to the War of Independence of the United States* (1838). Rochambeau's correspondence from his arrival at Newport to the close of the Virginia campaign has been printed in Daniel, *Histoire de la participation de la France à l'établissement des Etats Unis d'Amérique,* vol. v. (Paris, 1892). A brief anonymous work entitled *Journal*

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des opérations du corps français sous le commandement du comte de Rochambeau, which has been translated into English and published in several forms, has been attributed to him, and he is supposed to have inspired if not actually collaborated in the work of Françoise Soulé, *Histoire des troubles de l'Amérique anglaise* (Paris, 1787).

ROCH'DALE. A manufacturing town in Lancashire, England, 11 miles north-northeast of Manchester (Map: England, D 3). The parish church dates from the twelfth century. There is a free grammar school founded in 1565. The town hall is a fine building. Rochdale is noteworthy in economic history as the scene of the first successful experiment in coöperation. (See ROCHDALE PIONEERS.) Woolen manufactures were introduced by a colony of Flemings in the reign of Edward III.; cotton is manufactured and there are a number of iron foundries and machine works. There is a considerable trade in coal and stone. Rochdale is mentioned in Domesday as *Recedam*. Its first charter was granted by Richard I. John Bright was a native of Rochdale; a bronze statue to his memory is one of the town's monuments. Population, in 1891, 76,160; in 1901, 83,100. Consult: Fishwick, *History of Rochdale* (Rochdale, 1889); Mattley, *Annals of Rochdale* (ib., 1899).

ROCHDALE PIONEERS (Rochdale Society of Equitable Pioneers). An organization of flannel weavers of Rochdale, Lancashire, England, founded in 1844, the first to attain distinction in the coöperative movement. There were 28 members, each subscribing for one share of stock, a total of £28, and this not all paid in. The second year there were 74 members and a capital stock of £181. A small store was opened and the necessaries of life sold to members almost at cost. Within twenty-five years the society had a membership of over 5560 and a stock of £81,232. The small store expanded into numerous shops and manufactories, and a hospital, reading rooms, a large library, and classes in arts and sciences were established. The store was managed in the name and for the advantage of the working-class purchasers. The town savings bank failed soon after the organization of the company, which thereupon practically took the place of the bank. During the early years the promoters served without recompense, but afterwards salaried officials were employed. The profits were divided. After paying all expenses and a dividend of 5 per cent. on the capital stock, 2.5 per cent. of the balance was allotted to the educational fund, and the remainder was distributed among the members in proportion to their purchases. The society has not only been a great success, but it has stimulated the coöperative movement throughout England. Consult: Jones, *Coöperative Production* (Oxford, 1894); Holyoake, *The History of Coöperation in Rochdale* (London, 1879); Potter, *The Coöperative Movement* (ib., 1891). See COÖPERATION.

ROCHE (Fr., rock), ROCK ALUM, or ROMAN ALUM. A potash alum originally from Civita Vecchia, Italy, near where it is said to occur native, but also made from alunite, and highly prized by dyers owing to its freedom from iron sulphate. The name is also frequently given to common alum artificially colored, as by Armenian bole or Venetian red.

ROCHE, Sir BOYLE (1743-1807). An Irish politician. In early life he entered the army, and saw service in America. He sat in the Irish Parliament from 1777 until the Union, uniformly supporting the government, in return for which he was made a baronet and received a pension. He contributed not a little to the bringing about of the Union; but his fame chiefly rests upon his reputation as an inveterate perpetrator of 'bulls' of the true Irish variety.

ROCHE, JAMES JEFFREY (1847—). An American poet and journalist of Irish stock. He was born in Montmellick, Queens County, Ireland. In his infancy his parents emigrated to Prince Edward Island, where he was educated in Saint Dunstan's College. In 1866 he went to Boston, Mass., where he engaged in commerce and in 1883 joined the editorial staff of the *Pilot*, then edited by John Boyle O'Reilly. In 1890 Roche became its editor-in-chief. His writings include: *Songs and Satires* (1887); *Ballads of Blue Water* (1895); *The Vase, and Other Bric-a-Brac* (1900); *Life of John Boyle O'Reilly* (1891); and *The Story of the Filibusters* (1891).

ROCHE, rôsh, TROÏLUS DE MESGOUAT, Marquis de la. A French explorer and colonizer, born in Brittany, France, about the middle of the sixteenth century. In 1598 he bargained with Henry IV. to colonize New France. He was made lieutenant-general of Canada, Hochelaga, Newfoundland, and Labrador, and of the adjacent countries "not possessed by any Christian prince." Having gathered an expedition largely composed of convicts from the prisons, in 1598 he set sail with these in a small vessel and explored the country about the mouth of the Saint Lawrence. Upon Sable Island he left the convicts, 40 in number, intending to transfer them afterwards to the mainland, but his vessel was driven by a tempest back to France, and it was not until 1603 that the 12 survivors were taken off by Chefdhôtel. Consult: Champlain's *Voyages*, in vol. viii. of the *Publications of the Prince Society* (Boston, 1878-82); and Parkman, *Pioneers of New France* (ib., 1865; later ed. 1897).

ROCHEFORT, rôsh'fôr'. A fortified seaport and naval arsenal in the Department of Charente-Inférieure, France, on the right bank of the Charente, nine miles from the sea, and 18 miles southeast of La Rochelle (Map: France, E 6). It is surrounded by ramparts, and protected by forts at the mouth of the river, and is a clean, well-built town. The harbor is one of the three largest in France. Rochefort has fine wharfs, extensive magazines, dock-yards, cannon foundries, and large bread and biscuit stores. The most celebrated of its many institutions are the marine hospital, founded in 1787, and the general civil college. Shipbuilding is the most important industry, and some furniture is manufactured. Rochefort's rise from a fishing village dates from 1666, when Louis XIV. chose it for a naval station and Vauban planned its fortifications. While waiting at the neighboring Ile d'Aix for a chance to escape from Rochefort to America, Napoleon surrendered to the British. Population, in 1901, 36,458.

ROCHEFORT, VICTOR HENRI, Count de Rochefort-Lucay (1830—). A French journalist and politician, born in Paris. He was educated at the College of Saint-Louis and shortly after his

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graduation he found employment in a Government office. In 1863 Rochefort became one of the editors of the *Figaro*, and in 1866 began a series of mordant attacks on the Napoleonic Government which aroused the hostility of the authorities until the publisher dropped Rochefort from the editorial staff. The repeal of the most arbitrary restrictions on the press in 1868 enabled Rochefort to start *La Lanterne*, a weekly which soon obtained an immense circulation. Convicted of disrespect toward the Government and sentenced to a year in prison, a fine of 10,000 francs, and deprivation of civil and political rights, Rochefort escaped to Brussels, where he continued the publication of *La Lanterne*. In 1869 he was elected to the Legislative Assembly. He showed himself as hostile as ever to the Government; published *La Marseillaise*, and was again sent to prison, but on the downfall of the Empire he regained his liberty and was for a short time member of the Government of National Defense. After the capitulation of Paris, January, 1871, he founded *Le Mot d'Ordre*, which defended Gambetta's policy. He believed that Thiers was unfriendly to a republic, and threw in his lot with the Commune. Rochefort was arrested, tried, and in 1873 sent to the penal colony of New Caledonia. He escaped in 1874, returned and revived *La Lanterne* in Geneva. The general amnesty of July, 1880, permitted his return to Paris, where he established a journal named *L'Intransigeant*. He was elected to the Chamber of Deputies in 1885, but resigned the following year. In 1888 Rochefort played a prominent part in the political agitation caused by the movement in favor of General Boulanger, whom he earnestly supported, and with whom, in 1889, he suffered exile. He returned to Paris after the amnesty of 1895. He published *Les aventures de ma vie* (Paris, 1896).

ROCHEFOUCAULD, rôsh'fōō'kô'. See LA ROCHEFOUCAULD.

ROCHEFOUCAULD-LIANCOURT, lē'äN', kōōr'. See LA ROCHEFOUCAULD-LIANCOURT.

ROCHEGROSSE, rôsh'grôs', GEORGES (1859 —). A French painter, born at Versailles. He was a pupil of Jules Lefèbvre and Boulanger. His themes are generally historical, and he treats them in an emotional, naturalistic style, with a distinct reveling in the horrible. "Vitellius" (1882), "Andromache" (1883), "La Jacquerie" (1885), "The Fall of Babylon" (1891), and "The Death of the Emperor Geta" (1899) are examples of his energetic but sensational and often brutal painting. In quite another style and beautiful in color is his "Knight Among the Flowers" (1894, in the Luxembourg).

ROCHELLE, rô'shĕl', LA. The capital of the Department of Charente-Inférieure, France, a seaport and first-class fortress, situated on a bay on the western coast, 290 miles by rail from Paris and 120 miles from Bordeaux (Map: France, E 5). It is a well-built town surrounded by a line of fortifications over three miles in circumference. Its harbor is one of the best on the coast. The most interesting building of the town is the town hall, dating from 1486-1607, with beautifully carved belfries, a richly decorated exterior, and a statue of Guiton, Mayor of La Rochelle during the siege by Richelieu. The cathedral is a Grecian structure of the eighteenth century. Other interesting buildings are the exchange, the palais de justice, and the quaint House of Henry II. The old episcopal palace now contains a library of over 46,000 volumes and about 1000 manuscripts, and a picture gallery with paintings by Corot, Rousseau, and other modern French artists. There are a lycée, a theological seminary, a training school for teachers, an academy of art, an archæological museum, and a botanical garden. The chief products are sardines, porcelain and glass wares, textiles, sugar, etc. There is some shipbuilding and trade in agricultural products and groceries. Population, in 1891, 26,808; in 1901, 31,559.

La Rochelle is first mentioned as *Rupella* in 981. It was fortified and endowed with some privileges by William IX. of Aquitaine, and its franchises were further increased with its passing under the rule of England, as a part of the dowry of Eleanor, wife of Henry Plantagenet. In 1224 Louis VIII. of France obtained possession of it. From the fourteenth century to the seventeenth La Rochelle had a representative form of government and occupied a prominent commercial position. As a stronghold of Calvinism it became a target for attacks both by land and by sea, and withstood a siege of six and one-half months by the Catholic army in 1573, which terminated in a treaty by which the Huguenots were granted liberty of worship. The activity of La Rochelle at the head of the Huguenot party provoked Cardinal Richelieu to crush the town. Accordingly, La Rochelle was invested by a strong army on August 15, 1627, and after a siege of over fourteen months during which two English fleets were repulsed by the besieging army and the population dwindled from 18,000 to 5000, the town capitulated on October 28, 1628. Its fortifications were restored by Vauban, but the town never recovered its former importance. Consult Barbot, *Histoire de la Rochelle* (Paris, 1886-90).

ROCHELLE SALT. The popular name of the double tartrate of sodium and potassium, having the formula $KNaC_4H_4O_6 + 4H_2O$. It was discovered in 1672 by a Rochelle apothecary named Seignette. It occurs, when pure, in colorless transparent prisms, generally eight-sided, and in taste it resembles common salt. It is prepared by neutralizing acid potassium tartrate with a hot solution of sodium carbonate. This salt is a mild and efficient laxative, less disagreeable to the taste than most of the saline purgatives.

ROCH'ESTER. A city and river-port in Kent, England, on the right bank of the Medway, 26 miles east-southeast of London (Map: England, G 5). Together with Chatham (q.v.) and Strood, it forms one large town. The celebrated cathedral is 306 feet long. The nave and crypt are Norman, and the choir and transepts early English. The castle, crowning an eminence, is a solid and massive Norman keep. In 1883 it was purchased by the city, and its grounds were turned into a public garden overlooking the Medway. The city owns waterworks, markets, and a library, and provides for technical education. There are naval and military establishments in the city, and manufactures of oil and oil cake, of agricultural implements, and traction engines. Rochester is the ancient Durobrivæ. The bishopric of Rochester was founded in 604. Population, in 1901, 30,-

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600. Consult Palmer, *Rochester Cathedral* (London, 1897).

ROCHESTER. A city in Strafford County, N. H., 52 miles southwest of Portland, Maine, on the Cocheco River, and on the Boston and Maine and the Portland and Rochester railroads (Map: New Hampshire, K 8). It has a public library. The annual fair held here is very largely attended. Shoes, woolen goods, brick, and lumber products constitute the most important manufactures. Excellent water power for the various establishments is derived from the Cocheco River. The population, in 1890, was 7396; in 1900, 8466. Rochester was incorporated as a town by royal charter in 1722, but was not settled until six years later. In 1891 it was chartered as a city. Consult McDuffee, *History of the Town of Rochester* (Manchester, N. H., 1892).

ROCHESTER. The county-seat of Monroe County, N. Y., and the third largest city of the State, 69 miles east by north of Buffalo (Map: New York, C 2). It is situated seven miles from Lake Ontario, and is nearly bisected by the Genesee River, which flows through a deep, precipitous gorge in the northern part of the city. In three falls and several rapids it makes a total descent of 257 feet within the municipal limits. The upper falls, 95 feet high, are near the centre of the city. Ten bridges span the river, one of which is 212 feet high and 990 feet long. The aqueduct (848 feet long and 45 feet wide) by which the Erie Canal crosses the river is also a noteworthy engineering feature. Among the railroads that enter Rochester are the New York Central and Hudson River, the West Shore, the Erie, the Lehigh Valley, the Pennsylvania, the Rome, Watertown and Ogdensburg, and the Buffalo, Rochester and Pittsburg.

The site of the city is level and elevated, its altitude being about 500 feet above the sea and 263 feet above Lake Ontario. Its total area is 18 square miles. Rochester is well laid out. The streets are broad and regular, and in the residential district are very beautiful. Here the detached residences, the abundance of shade trees, and lawns and gardens are well worthy of note. The total mileage of streets is about 325, of which 126 miles are paved, asphalt, granite, and Belgian blocks and macadam being mostly used. The parks and cemeteries are of special interest. In addition to a number of small parks and squares in various parts of the city, there are the Genesee Valley Park, the largest in area (340 acres), the East and West Seneca, and Highland parks. The Genesee Valley Park and Seneca Park are on the Genesee River, the latter being situated on both banks. They are noted for their wild picturesqueness. In Seneca Park (East) are zoölogical gardens. Highland Park has an extensive collection of low-growing trees and shrubs. Washington Square contains the Soldiers' and Sailors' Monument. The public park system includes 692 acres. Among the cemeteries, the most noteworthy is Mount Hope, established in 1838. Frederick Douglass is buried here. A statue to his memory was erected in 1898 in one of the city squares. Many charming summer resorts on the shore of the lake are connected with the city by electric roads, as well as by splendid driveways. The street railway system now reaches considerably beyond the city limits, and plans have been projected for its extension as far as Syracuse to the east and Niagara Falls and Buffalo to the west.

The court-house, of granite, completed in 1896, is prominent among the public buildings. Other structures of note are the city hall, the post-office, the Chamber of Commerce, the State arsenal, the Powers Hotel, the Powers Building, the Masonic Temple, the Free Academy, the East Side and West Side High Schools, the Genesee Valley Club House, the Wilder Building, the German-American Building, and the Granite Building. There are a number of charitable and penal institutions. The Western New York Institution for Deaf Mutes is here, as are also a State Industrial School and a State Hospital for the Insane. Besides the Monroe County Penitentiary and the County Almshouse, there are many private charities, among which may be mentioned the Old Ladies' Home, hospitals, asylums, etc. Rochester is the seat of the University of Rochester (Baptist), opened in 1850, Rochester Theological Seminary (Baptist), opened in 1851, and Saint Bernard's Seminary (Roman Catholic), opened in 1893. The University of Rochester and the Rochester Theological Seminary, though under the same denominational control, have no direct relation with each other. The Wagner Memorial College is the most prominent of the schools for secondary education. The Mechanics' Institute, founded in 1885, is similar in scope to the Armour Institute of Chicago. It has been recently installed in a new building, costing $250,000. Its students number more than 4000. The Reynolds Library with more than 50,000 volumes, the Central Library with 35,000, and the Law Library with 21,000, are the largest collections of books in the city, aside from those belonging to the educational institutions.

Rochester is primarily a manufacturing city. It is, nevertheless, the distributing centre for a highly productive agricultural section, and carries on considerable lake commerce through its port, Charlotte, on Lake Ontario at the mouth of the Genesee. The foreign trade of the Genesee customs district in 1901 was valued at $2,123,000, of which more than $1,280,000 was exports. The immense water power afforded by the Genesee River at this point has given Rochester the name 'Power City.' This natural advantage has contributed largely to the industrial prominence of the city. The water power is electrically developed. In 1901 these works were equipped to furnish 30,000 horse power, and a considerable expansion of the system was then in prospect. Once noted for its extensive flour-milling interests, Rochester now is best known for its production of photographic apparatus and optical instruments, though the output of these is less in value than that of several other of its many industries. It is widely known also for its extensive nurseries, some fifty establishments being in the city and vicinity. In the census year 1900, capital to the amount of $49,086,000 was invested in the various manufacturing industries. The value of the products was $69,130,000. Rochester is third in importance among the industrial cities of the State. The leading manufactures are men's clothing, boots and shoes, foundry and machine shop products, tobacco, cigars and cigarettes, flouring and grist mill products, malt liquors, furniture, photographic apparatus and materials, and optical goods. There are also in

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Rochester several concerns that rank among the largest in the world in their respective lines. These include a preserving establishment, a button factory, lubricating oil works, a cider and vinegar plant, and a manufactory of folding-box machinery.

Rochester is a city of the second class and as such is governed under the regular charter provided by legislative enactment. This charter became operative on January 1, 1900. The government is vested in a mayor and common council elected every two years, and in various administrative departments, for further explanation of which see paragraph on *Administration* under ALBANY. The comptroller, treasurer, police justice, assessors, and supervisors are chosen by popular election; other officials are appointed by the mayor. The city clerk is elected by the common council. The city spends annually for maintenance and operation about $2,916,350, the principal items being: schools, $703,285; interest on debt, $319,000; municipal lighting, $225,000; the fire department, $244,387; the police department, $204,800; streets, $190,000; ash and garbage removal, $111,000; water-works, $110,000; charitable institutions, $95,000. The net debt of the city in 1902 was $10,246,018; the assessed valuation of real and personal property, $116,448,973. The water-works, which have cost $7,463,129, are owned and operated by the municipality. There are in all 348 miles of mains. Two systems are in operation—a gravity system for drinking-water, deriving its supply from lakes some 30 miles south of the city, and a direct pumping system taking water from the Genesee River. The direct system is used for manufacturing purposes, for the fire department, etc. These works have a daily capacity of 7,000,000 gallons. In connection with the gravity system are a storage reservoir and a distributing reservoir, possessing capacities respectively of 63,500,000 and 22,500,000 gallons.

The population of Rochester, in 1820, was 2063; in 1850, 36,403; in 1870, 62,386; in 1880, 89,366; in 1890, 133,896; in 1900, 162,608. The total, in 1900, included 40,748 persons of foreign birth and 601 of negro descent.

Rochester was permanently settled in 1810 on land owned by Nathaniel Rochester, William Fitzhugh, and Charles Carroll, all of Maryland. The first frame dwelling house was built two years later. Until 1822 the village (incorporated in 1817) was known as Rochesterville, and in 1834 the city of Rochester was chartered. The opening of the Erie Canal in 1825 gave a great impetus to the growth of the place. Rochester was the centre of the Anti-Masonic excitement from 1826 to 1835, William Morgan having been a resident of the city before his abduction from Batavia. (See ANTI-MASONS.) In 1849 the famous 'Rochester Rappings' attracted widespread attention and gave rise to modern spiritualism in the United States. Before the Civil War, Rochester, being the home of Myron Holley and Frederick Douglass, was prominent in the anti-slavery struggle, and it was here that Seward, in 1858, made the famous speech in which he spoke of the impending 'irrepressible conflict between opposing and enduring forces.' Consult: Parker, *Rochester, A Story Historical* (Rochester, 1884); *History and Commerce of Rochester* (New York, 1894).

ROCHESTER. A borough in Beaver County, Pa., 25 miles northwest of Pittsburg; on the Ohio River, at its junction with the Beaver, and on railroads of the Pennsylvania system (Map: Pennsylvania, A 3). It has valuable advantages as an industrial centre, being situated in a district producing gas, oil, coal, fire clay, and building stone. The manufactures include glass (tumblers, cut glass, bottles), pottery, brick, stoves, flour, and lumber products. Population, in 1890, 3649; in 1900, 4688.

ROCHESTER, HENRY WILMOT, Earl of (c.1612-58). An adherent of Charles I. and Charles II. For his part in the plot against the Long Parliament he was expelled from the Commons. In the Civil War he sided with the King, and defeated Waller at Roundway Down in 1643, and again in 1644 at Cropredy Bridge, but because of his intrigues and the hostility of Prince Rupert and of Lord Digby was deprived of his command. He retired to France and became an intimate friend of Charles II., whom he rescued several times by his skillful disguises. He was made Earl of Rochester in 1652, was very successful in diplomatic errands to the Continent, and took part in most of the Royalist plots against Cromwell.

ROCHESTER, JOHN WILMOT, second Earl of (1647-80). An English poet, wit, and courtier. He was born at Ditchley, Oxfordshire. He entered Wadham College, Oxford, when only twelve years old; and at fourteen, by titular privilege, was, with other persons of rank, made M.A. by Lord Clarendon. After traveling in France and Italy, he became attached to the Court, and rose high in favor with Charles II., who made him one of the gentlemen of the bedchamber and comptroller of Woodstock Park. His wit and love of pleasure made him a favorite of a dissolute court; he, however, incurred the displeasure of the King, and was committed to the Tower, for the forcible abduction of a celebrated beauty and heiress, Miss Mallett, who was rescued by her friends, but whom he subsequently married before he was twenty years old. He wrote prose and verse with facility, and Anthony Wood speaks of him as the greatest scholar among the nobility of his day; but as he grew older he gave less of his time to study, and more to wine and vicious companions. His health became undermined by excess and he died at the age of thirty-two. Bishop Burnet wrote an interesting account of his death under the title of *Some Passages of the Life and Death of John, Earl of Rochester* (1681), from which it appears that he sincerely repented his dissolute course. His published works include many love-songs, an elegant *Imitation of Horace on Lucilius*, a *Satire Against Man*, in which he is much indebted to Boileau, and an *Essay on Nothing*.

ROCHESTER, LAURENCE HYDE, Earl of (1641-1711). An English statesman, son of the historian Clarendon. He entered Parliament at the Restoration, acted on several diplomatic missions, and in 1679 became First Lord of the Treasury and Privy Councilor. In 1681 he was made Viscount Hyde. In the same year he negotiated the secret subsidy from France and in November became Earl of Rochester. On the accession of James II. he became Lord Treasurer. On account of his opposition to the King's Catholic policy, and for his stand as an English churchman, he

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was dismissed in 1687, with a large pension. In 1689 Rochester was in ill favor with Mary owing to his support of the suggestion of a regency, but regained her favor by his later diplomacy, was readmitted to the Privy Council in 1692, and in 1700 became Lord Lieutenant of Ireland and practically Premier. After William's death Anne's trust in him was undermined by the Marlboroughs, and he returned to power again only in 1710. Rochester edited his father's *History of the Great Rebellion* (1702-04).

ROCHESTER, NATHANIEL (1752-1831). An American soldier and manufacturer, born in Westmoreland County, Va., whence he early removed to Granville County, N. C. Rochester was a member of the Committee of Safety in 1775, and of the Provincial Congresses in 1775 and 1776. During the Revolutionary War he superintended the manufacture of arms at Hillsboro, and at its close removed first to Philadelphia and afterwards to Hagerstown, Md. In 1802 with Carroll and Fitzhugh he bought the 'Hundred Acre Tract,' now in the centre of the city of Rochester. He removed to Dansville, N. Y., in 1810 and established a paper mill, and again removed to Bloomfield. In 1817 he was secretary of a convention at Canandaigua to urge the completion of the Erie Canal. In 1818 he removed to the village of Rochesterville (the future Rochester), which had been named in his honor. He succeeded in securing the passage of the bill creating the new county of Monroe in 1821. Consult Rochester, *Early History of the Rochester Family in America* (Buffalo, 1882).

ROCHESTER, UNIVERSITY OF. A collegiate institution at Rochester, N. Y., established in 1850 under Baptist auspices. Since 1900 women have been admitted as students. The work of the university is arranged in three courses—classical, philosophical, and scientific—leading to the bachelor's degree. In 1903 the students numbered 245 and the faculty 20. The campus and five buildings with equipment, including a library of 38,595 volumes, were valued at $501,568; the college property was estimated at $1,357,263; the endowment was $765,000, and the income $51,009.

ROCHE-SUR-YON, rôsh'sur'yôn', LA. The capital of the Department of Vendée, France, picturesquely situated on a hill on the right bank of the Yon, 38 miles south of Nantes (Map: France, E 5). It was a village of 800 inhabitants when Napoleon I. selected it for the capital of the department and named it Napoléon-Vendée. Its feudal castle was dismantled by order of Louis XIII. Its ruins formed a quarry for the building of the modern town for which Napoleon I. decreed an appropriation of 3,000,000 francs. There are an equestrian statue to Napoleon I. and a museum containing some good paintings. Population, in 1900, 13,629.

ROCHOW, rôk'ô, EBERHARD VON (1734-1805). A German philanthropist and educational reformer, born in Berlin. His military career having been cut short in the earliest campaigns of the Seven Years' War by wounds in each hand, he devoted himself to popular education, and in 1773 built a school at Rekahn, and another at Krahne in 1799. In both he was greatly assisted by Bruns. Rochow favored State schools and compulsory attendance. His method, especially adapted for country schools, founded on a fairly correct idea of the growth of the mental faculties, and urging that only the actually useful should be taught, was set forth in 1772 under the title *Versuch eines Schulbuches für Kinder der Landleute*, and the system was put into practice in his juvenile writings, of which *Der Bauernfreund* (1776) is best known. Rochow's correspondence was published by Jonas (Berlin, 1884) and selections from his works by Gansen (Paderborn, 1894). Consult Pohlisch, *Die pädagogischen Verdienste des Domherrn von Rochow* (Zwickau, 1894).

ROCK (AS. *rocc*, OF. *roc, roche*, Fr. *roche*, from ML. *roca, rocca*, rock; probably from Ir., Gael. *roc*, Bret. *roch*, rock). A portion of the solid earth. Rocks are composed of mineral matter, although some have an organic origin. In contrast with minerals they are more complex, being aggregates of minerals, usually, though not always, containing a number of different mineral species. This number may be ten or more, though in rare cases rocks represent a single mineral; and there are seldom more than two or three component minerals which are present in large quantity.

ROCKS CLASSIFIED GENETICALLY. As respects their origin rocks fall into three grand divisions, viz.: (1) Sedimentary, clastic, or aqueous rocks; (2) massive or igneous rocks; and (3) metamorphic rocks. Of these divisions the first includes the more diverse types and no single name has been found sufficiently comprehensive to include them all. The most abundant and widely distributed class within this division is that of the true sedimentary or clastic rocks, which are made up of sediment or detritus deposited in water. If laid down upon the ocean bottom rocks of this class are described as *marine*, examples of which are mud-stones or shales (q.v.), and some limestones (q.v.); if deposited along shore, *littoral*, of which conglomerate (q.v.) and sandstone (q.v.) are examples; and if deposited in lakes, *lacustrine*, or if in streams, *fluviatile*, as, for example, silt. Water in the form of ice has likewise been largely instrumental in transporting and depositing rock materials such as gravel, sand, and clay. Again, water confined within the outer zone of the earth's crust through solution and subsequent deposition in crevices and other openings has produced the rocks known as veins (q.v.) or veinstones, which, though comparatively small in bulk, are yet of great importance as the repository of the valuable metals. These are the aqueous rocks in the restricted sense. In arid regions the wind has been an important agent in transporting rock material and producing deposits which are designated æolian accumulations (q.v.). Such a deposit is that of the loess (q.v.) of China.

Massive or igneous rocks are the product of consolidation from cooling of a molten mass or magma. The consolidation may have occurred below the earth's surface either in subterranean reservoirs—batholites (q.v.), laccolites (q.v.), or bosses—producing rock masses more or less equally developed as respects their several dimensions; or the consolidation may have occurred within a fissure forming a comparatively thin rock wall bounded by plane surfaces—dike (q.v.). In either of the above cases the rock formed is said to be of intrusive origin. If the molten mass reached the surface of the earth

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before consolidation and was poured out either as a broad layer (sheet) or as a stream, the rock produced is described as of extrusive, effusive, or volcanic origin. See IGNEOUS ROCKS.

The division of metamorphic rocks is composed of types developed from processes of alteration out of originally igneous or sedimentary rocks, but it includes not only those rocks which may be traced to the one class or the other, but also those the origin of which is in doubt. Together the several types of this division are described under the name crystalline schists, of which gneiss (q.v.), schist (q.v.), and phyllite are the most abundant members. See METAMORPHIC ROCKS.

Unaltered sedimentary rocks are further subdivided into those of mechanical, chemical, and organic origin. Of the first mentioned class are the greater number—the true sediments and the æolian deposits. Sand and gravel, greensand, loess (q.v.), clay, breccia (q.v.), conglomerate (q.v.), graywacke (q.v.), and shale (q.v.) have this derivation. Of chemical origin are the siliceous sinters such as are to-day forming about the geysers in the Yellowstone National Park; the calcareous sinters of caverns in limestone, including stalactites, travertine (q.v.), veinstones, deposits of gypsum (q.v.), and limonite (q.v.), and the many rocks of concretionary structure known as oölite (q.v.). Of organic origin are chalk (q.v.), flint (q.v.), shell limestone, and chert (q.v.). Marl (q.v.), cement rock, lithographic stone (q.v.), and the several varieties of peat (q.v.) and coal (q.v.) have also an organic origin. The larger masses of compact limestone (q.v.) and magnesian limestone or dolomite (q.v.) are known to have an organic and generally also a marine origin, but the exact manner of their formation is a problem regarding which there are many opinions. The calcareous ooze which is now forming over the deep-sea bottoms is composed almost entirely of the tests of pelagic organisms, whereas such structures are found in the rocks only in chalk, a formation of comparatively rare occurrence. It has been suggested that the compact limestones which are so generally composed of crystals of calcite are produced from the resolution of the remains of these organisms now collecting upon the sea bottom, perhaps even at the bottom of the ocean in the layers beneath the deposit of ooze. It is certain that a deposit of compact limestone is forming directly from water in the Everglades of Florida; and it is inferred that this process is a more or less widely distributed one. Limestones may, however, form from the evaporation of an inclosed sea, as has happened in past geological ages within the area of the Western United States.

MECHANICAL SEDIMENTS CLASSIFIED ON BASIS OF COMPOSITION. The great class of mechanical sedimentary rocks are classified on the basis of their dominant constituent as arenaceous or siliceous rocks, argillaceous rocks, and calcareous rocks. The first mentioned rocks contain much quartz or silica; those of the second class abound in clayey material, the base of which is a silicate of alumina and hydrogen (kaolin or china clay) (q.v.), while the class of the calcareous rocks are essentially composed of carbonate of calcium, or of calcium and magnesium in the form of the minerals calcite, aragonite, or dolomite. Arkose, graywacke, sandstone, conglomerate, sand, and gravel are the more abundant siliceous sedimentary rocks. Representatives of the argillaceous rocks are argillite or mudstone, shale, clay, mud, and silt. Marl and calcareous shale are calcareous-argillaceous sediments and form a transitional member connecting the argillaceous with the calcareous sedimentary rocks. Under the calcareous sediments are included limestone and dolomite, chert, etc. See ARENACEOUS ROCKS; ARGILLACEOUS ROCKS; CALCAREOUS ROCKS.

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ROCK BADGER, or ROCK RABBIT. See HYRAX.

ROCK BASS. A gamy and excellent bass (*Ambloplites rupestris*) of the Northern States and Mississippi Valley, called also 'redeye' and 'goggle-eye.' It is a foot long, olive green, with a brassy tinge and much dark mottling, and a black spot on each scale, forming interrupted stripes, the young irregularly barred and blotched. These bass are found in clear streams and lakes, where they keep about rocks or sunken logs. See Plate of BASS.

ROCK BUTTER. A name given to a variety of the mineral halotrichite. It is a yellowish butter-like substance that is found as an efflorescence or exudation from some alum slates, notably those at Hurlet and Campsie, near Glasgow, Scotland, and at Rossville, Richmond County, N. Y. It is called also *mountain butter*. The name has likewise been applied to certain varieties of the mineral chrismatite.

ROCK-COCK. A South American bird, more usually called cock-of-the-rock (q.v.). It is a type of the genus Ruficola, but was formerly included among the related pipras.

ROCK-CRAB. An indefinite general name for a variety of crabs customarily living on rocky bottoms, as, along the New England coast, the Jonah crab. The name belongs rather to the family Cancridae, in which belong more common edible crabs than to any other group.

ROCK CRYSTAL. A colorless, transparent variety of crystallized quartz. The name is applied chiefly to the massive varieties, such as Brazilian pebble, which is used for lenses; but it also includes the small distinct crystals which are sold as imitations of the diamond and are called variously Bristol diamonds, Lake George diamonds, etc. The name is likewise sometimes extended to the violet variety of quartz or amethyst, to the red variety or Bohemian ruby or Silesian ruby, to the yellow variety or citrine or false topaz, and to the brown variety or smoky quartz. Specimens are sometimes found containing inclusions of hair-like or needle-like crystals of other minerals such as actinolite, asbestos, epidote, göthite, hornblende, rutile, tourmaline, etc., which are called variously by the names of *Cupid's arrows, Cupid's nets, Thetis's hair-stone, Venus's hair-stone*, etc.

ROCK-DOVE. A wild dove of Western Europe (*Columba livia*). See PIGEON.

ROCKEFELLER, JOHN DAVISON (1839—). An American capitalist, born in Richford, Tioga

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County, N. Y. When twelve years old he was taken by his parents to Cleveland, Ohio, where he was educated in the public schools, and at sixteen became a clerk in a commission house. In 1858 he embarked in the commission business himself with a partner named Clark. Both members of the firm were resourceful and clever at driving bargains, and their success was immediate. In 1862 they became associated with Samuel Andrews, an expert oil refiner, and, under the firm name of Andrews, Clark & Company, engaged extensively in the oil business. William Rockefeller, a brother, was admitted to partnership, and a new company, William Rockefeller & Co., was formed, which, in 1865, built, at Cleveland, a large refinery, known as the Standard Oil Refinery. The next extension was the formation of an eastern branch at New York, with Henry M. Flagler as an additional partner. In 1870 the several firms were combined under the name of the Standard Oil Company, with a capital of $1,000,000. Of the combination John D. Rockefeller was the president and controlling spirit. From this time on all his energies were bent toward obtaining control of the oil business of the entire country. To accomplish this it was necessary to obtain control not only of the output of the oil fields, but of the means of transportation, and Rockefeller devised a systematic scheme of making arrangements with the railroads whereby the Standard Oil Company, by a system of rebates, should be given preferential shipping rates, that would, in time, render competition next to impossible. With this end in view a coöperative concern known as the South Improvement Company was organized, but so great was the opposition that it was soon dissolved, and less open methods to the same end were adopted. Gradually the Standard Oil Company absorbed or drove out of business most of its principal rivals, and its influence or alliance with the railroads became closer. In 1882 John D. Rockefeller organized the Standard Oil Trust, but after a ten years' existence it was dissolved. Since then the various companies have been operated separately, but all are under the management of Rockefeller, whose control of the oil business is as complete as though he had but one company to look after. In the intervals of a busy career Rockefeller found time to devote to religious, benevolent, and educational institutions, particularly those connected with the Baptist Church. In 1892 he founded and endowed the University of Chicago, the full title of which is "The University of Chicago, founded by John D. Rockefeller." To this institution in 1903 he had given in all more than $6,500,000. He also gave largely to other institutions. His gifts for education, which aggregate a greater sum than has ever before been contributed by a single person to such purposes, have been mostly conditional upon the raising of a similar amount by the institution benefited.

ROCKET. See ARTILLERY; PYROTECHNY; SIGNALING AND TELEGRAPHING, MILITARY; SIGNALS, MARINE.

ROCKET. See DAME'S VIOLET.

ROCKFISH. The name of a variety of fishes which haunt rocky places. In the Eastern States the term is applied to (1) the striped bass (*Roccus lineatus*), (2) the rock bass (q.v.), (3) the yellow-finned grouper (*Myctioperca venenosa*) of Florida and southward, which is about three feet long and clear olive green, with light green and orange-brown markings, and (4) to a familiar killifish (*Fundulus majalis*).

On the Pacific Coast 'rockfish' is a general name for a large group of marine shore-fishes of the family Scorpænidæ, of which about thirty genera and 250 species are known. Many bring forth their young alive, the fry at birth being about a quarter of an inch in length. The typical rockfishes of California are those of the genus Sebastodes, of which 56 species are recognized by Jordan and Evermann, who monographed the group with much detail in their *Fishes of North and Middle America* (Washington, 1898). On the average they are about 15 inches long and weigh 2 or 3 pounds. Most of them are of brilliant hues, with striking markings. Nearly all of these fish are fair eating and furnish the principal part of the marine market supply of California. Consult: Goode, *Fishery Industries*, sec. i. (Washington, 1884); Eigenmann and Beeson, "Revision . . . of the Subfamily Sebastinæ," in *Proceedings of the National Museum*, vol. xvii. (Washington, 1894); Jordan and Evermann, *American Game and Food Fishes* (New York, 1902). Compare ROSEFISH; GROUPER.

ROCK'FORD. A city and the county-seat of Winnebago County, Ill., 87 miles west by north of Chicago, on Rock River, here spanned by several bridges, and on the Chicago and Northwestern, the Illinois Central, the Chicago, Burlington and Quincy, and the Chicago, Milwaukee and Saint Paul railroads (Map: Illinois, C 1). It is divided by the Rock River and covers a total area of about eight square miles. In the eastern section are the handsome building and grounds of Rockford College for Women. A public library with more than 35,000 volumes occupies a fine structure, the gift of Andrew Carnegie. Memorial Hall and the City and Saint Anthony's hospitals are among other prominent features of the city. The Ransom Medical and Surgical Sanitarium is two miles distant to the north, and the Broughton Sanitarium is at the city limits on the south. Good water-power and excellent transportation facilities have contributed largely to Rockford's industrial and commercial importance. In the census year of 1900 there was invested in the various industries capital amounting to $27,971,613. The total production was valued at $48,871,596. Furniture, hosiery and knit goods, foundry and machine-shop products, agricultural implements, clothing, and harness constitute the leading manufactures. The government is vested in a mayor, chosen biennially, and a unicameral council. The city spends annually for maintenance and operation about $378,000, the principal items being: Schools, $105,000; streets, $58,000; water-works, $53,000; fire department, $36,000; municipal lighting, $22,000; interest on debt, $20,000; police department, $20,000. Rockford was settled in 1834, laid out in 1836, and chartered as a city in 1852. It was enlarged by the annexation of suburbs in 1890. Population, in 1890, 23,584; in 1900, 31,051.

ROCKFORD COLLEGE. An undenominational institution for the higher education of women at Rockford, Ill., founded in 1849. It had in 1902 property valued at $173,000, with grounds and buildings worth $135,000, an endow-

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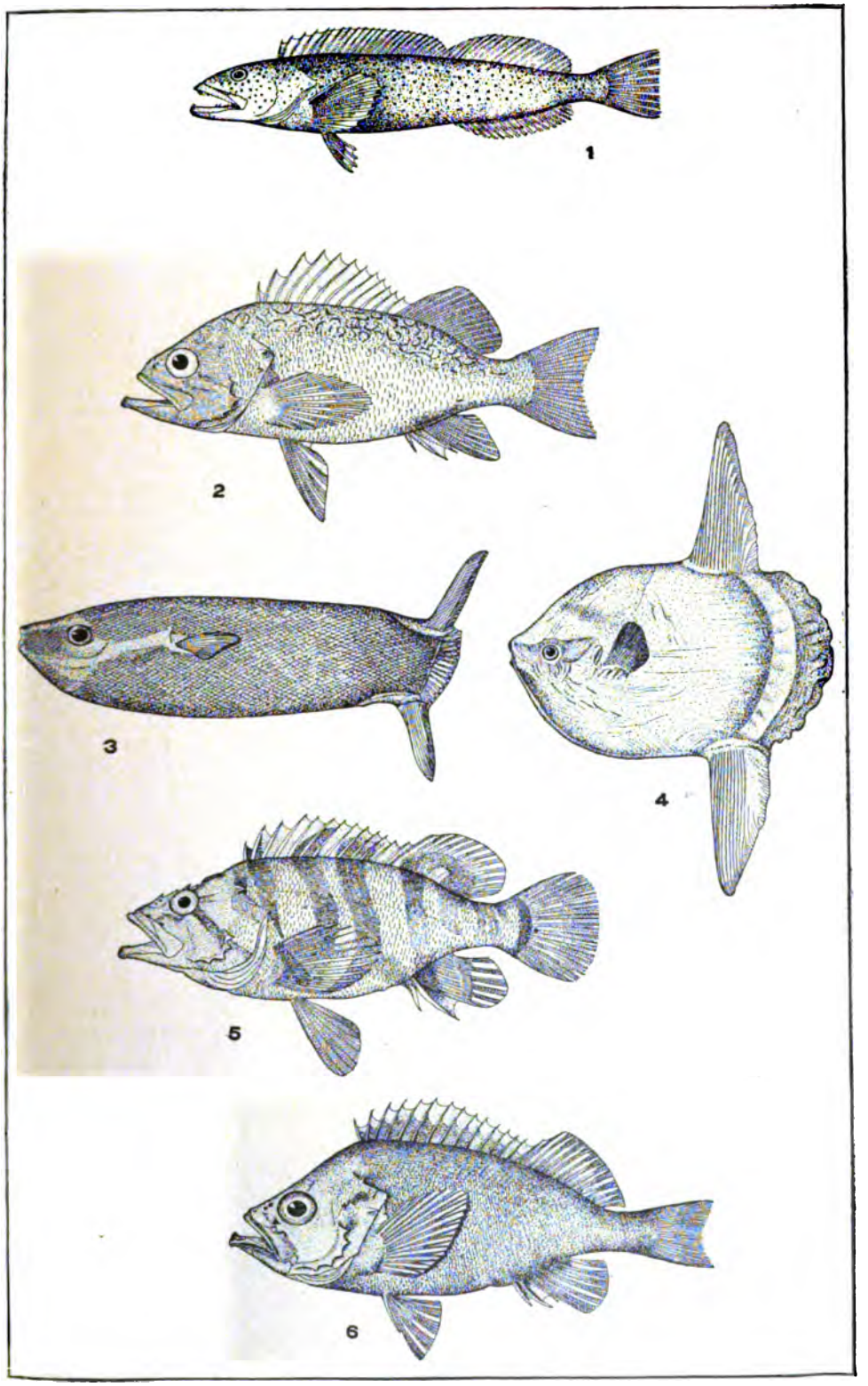
ROCKFISH, SUNFISH, ETC.



1. SAND CUSK (Ophidion elongatus).
2. ORANGE ROCKFISH (Sebastodes pinniger).
3. PELAGIC SUNFISH (Ranzania truncata).
4. COMMON SEA SUNFISH (Mola mola).
5. TREEFISH (Sebastodes serriceps).
6. ROSEFISH (Sebastes marinus).

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ment of $123,976, and an income of $21,324. Its library contained about 6000 volumes. The departments are collegiate, preparatory, music, and art, with a total attendance of 138 and a faculty of 20.

ROCKHAMP'TON. A seaport town of Livingstone County, Queensland, Australia, on the Fitzroy River, 380 miles north of Brisbane by rail (Map: Australia, J 3). It is the outlet for a large portion of Central Queensland and the port of the Morgan gold field. It is a well-built town, with wide and shaded streets, fine government buildings, a town hall, botanical gardens, etc. A bridge 1160 feet long spans the river. Its harbor for ocean steamers is at Port Alma, 36 miles below, but vessels of 1500 tons ascend to the city. Population, in 1891, 11,629; in 1900, 15,461.

ROCK HILL. A city in York County, S. C., 80 miles north of Columbia, on the Southern and the Ohio River and Charleston railroads (Map: South Carolina, C 2). It is the seat of the Winthrop Normal and Industrial College of South Carolina, a State institution for women. Cotton, farm produce, and fruit are extensively cultivated in the surrounding district. Its industries include cotton mills, a large buggy factory, a flour mill, brick plants, sash, door, and blind manufactories, and foundries and machine shops. The city is the headquarters of the Catawba Power Company, which is electrically developing 8000 horse-power on the Catawba River, five miles distant. Population, in 1890, 2744; in 1900, 5485.

ROCK'HILL, WILLIAM WOODVILLE (1854—). An American diplomat, traveler, and author, born in Philadelphia. In 1884 he was appointed second secretary of the American legation at Peking, the next year he was promoted to secretary, and in 1886 he was appointed chargé d'affaires in Korea. Between 1888 and 1892 he made two long journeys through China, Mongolia, and Tibet. In 1893-94 he was chief clerk in the United States Department of State, in 1894 he was appointed Third Assistant Secretary of State, and in 1896 was promoted to First Assistant Secretary. He was United States Minister to Greece, Rumania, and Servia from 1897 to 1899, when he became director of the Bureau of American Republics. His published works include: *Explorations in Mongolia and Tibet* (1893); *Diary of a Journey Through Mongolia and Tibet in 1891 and 1892* (1894); *The Land of the Lamas* (1891); *The Life of the Buddha and the Early History of His Order* (1884); *Notes on the Ethnology of Tibet* (1895); and *Report of W. W. Rockhill, Late Commissioner to China* (1901).

ROCK HIND. One of the groupers (*Epinephelus Adscensionis*), well known throughout the

ROCK HIND.

Western Atlantic and common in rocky places about all the West Indian coasts and islands, where it is known as 'cabra mora,' and is regarded as the best market fish of its kind. It is about 18 inches long, clouded greenish gray, everywhere spotted with orange, and with five dark roundish blotches along the back. See GROUPER.

ROCK-HOPPER. See PENGUIN.

ROCK'INGHAM, CHARLES WATSON-WENTWORTH, second Marquis of (1730-82). An English statesman. He was educated at Westminster School and Saint John's College, Cambridge. Belonging to an old Whig family, he received many honorary offices, and in 1750 succeeded his father in the peerage. In 1765 Rockingham was selected as Prime Minister, the chief men in his Cabinet being Conway, the Duke of Grafton, and the Duke of Newcastle. The Government was not a strong one, but it is famous on account of its repeal of the Stamp Act and the passing of other measures which conciliated the American Colonies. In 1766 the Ministry resigned and Rockingham for many years was an opponent of the King's policy and throughout showed friendship for America. On the resignation of Lord North in 1782 Lord Rockingham again became Prime Minister. The principal men this time in his Cabinet were Fox and Shelburne. Rockingham died on July 1st, within a little more than three months after his installation. Though not a man of great abilities, Rockingham was held in esteem by all, and his general acceptability was the cause of his selection on two occasions as Prime Minister. Consult: Albemarle, *Memoirs of Rockingham* (2 vols., London, 1852-53); Lecky, *History of England in the Eighteenth Century* (New York, 1878).

ROCKING STONES. Masses of rock so finely poised as to move backward and forward when pushed by the hand. They are generally formed of granite as being the stone that most easily resists general decomposition. The wearing away of the lower portions is usually the combined result of the sand-blast action of the wind and sand and the disintegrating action of frost or the effect of lichens which disintegrate the feldspar immediately below and contribute to the wasting of the rock. In ancient times rocking stones were used as a means of divination. Among the famous rocking stones is the Logan Rock, near the Land's End in Cornwall, whose weight is computed to be between 70 and 90 tons, and that at Island Magee, on Brown's Bay, County Antrim, Ireland, which is popularly believed to tremble or rock at the approach of sinners and malefactors. The largest rocking stone is that of Tandil, Argentine Republic.

ROCK ISLAND. A city and the county-seat of Rock Island County, Ill., 180 miles west by south of Chicago, on the Mississippi River and the Hennepin Canal, and on the Chicago, Rock Island and Pacific and its Rock Island and Peoria branch, the Chicago, Burlington and Quincy, the Chicago, Milwaukee and Saint Paul, and other railroads (Map: Illinois, B 2). It is the seat of Augustana College (Lutheran) opened in 1860, and has a public library with more than 14,000 volumes. On Government's Island, near the city, is the United States arsenal and armory, covering an area of nearly 1000 acres and costing about $10,000,000. There are railroad and highway bridges from the city to the island, which in turn is connected with Davenport, Iowa, by a fine highway and railway

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bridge, built by the United States Government. A second railroad bridge across the Mississippi connects the western parts of the two cities. An important railway centre, Rock Island also has large commercial and industrial interests. The dam in the Mississippi, constructed by the Federal Government, furnishes extensive water-power for manufacturing. The products of the various establishments include farm implements, stoves, brick, lumber, carriages, soap, beer, oilcloth, sashes, doors, and blinds. The government, under the revised charter of 1879, is vested in a mayor, elected every two years, and a unicameral council, and in administrative officials. Rock Island was settled in 1836, and was first incorporated in 1841. Population, in 1890, 13,634; in 1900, 19,493.

ROCK'LAND. A city and the county-seat of Knox County, Maine, 60 miles south of Bangor, on an inlet of Penobscot Bay, and on the Maine Central Railroad and the Bangor and Boston steamboat line (Map: Maine, E 7). Among the features of the city are the public library of 6000 volumes, the United States Government building, and the county court-house. A large harbor and excellent shipping facilities contribute to Rockland's importance as a commercial centre. The city is noted for its extensive lime-burning works and shipbuilding yards, and has also manufactures of brick, carriages, and cigars. The granite quarries of the vicinity have furnished materials for United States Government buildings. Population, in 1890, 8174; in 1900, 8150. Originally a part of Thomaston and separately incorporated as East Thomaston in 1848, Rockland received its present name in 1850, and was chartered as a city in 1854. Consult Eaton, *History of Thomaston, Rockland, and South Thomaston* (Hallowell, 1865).

ROCKLAND. A town in Plymouth County, Mass., 18 miles south-southeast of Boston, on the New York, New Haven and Hartford Railroad (Map: Massachusetts, F 3). It has some manufactures, of which shoes, tacks, and nails are the most important. There is a public library with 10,000 volumes. Originally a part of the town of Abington of the old Plymouth Colony, Rockland was incorporated as a separate town in 1874. Population, in 1890, 5213; in 1900, 5327.

ROCK OF AGES. The title of a celebrated hymn written by Augustus Toplady in 1776.

ROCK PLANTS. Plants whose natural habitat is associated with areas of rock. With the exception of marine forms (see BENTHOS), rock plants may be classed generally under the head xerophytes (q.v.). Some authors hold that the calcareous elements of limestone determine one type of vegetation, and siliceous rocks another. Hence, rock plants have been divided into calcareous plants and siliceous plants. But most authors contend that the differences which arise are more closely connected with the physical structures and properties of the rocks than with their chemical features, since certain considerations indicate that neither the chemical nor physical properties directly determine all of the differences in distribution.

ROCK'PORT. A town in Essex County, Mass., four miles northeast of Gloucester, on the Atlantic Ocean, and on the Boston and Maine Railroad (Map: Massachusetts, F 2). It has the Rockport and Pigeon Cove public libraries. The village of Pigeon Cove, which comprises the northern part of the town, has some reputation as a summer resort. Rockport is engaged in agriculture and fishing, and is noted for its extensive quarries of granite. Isinglass is the leading manufactured product. The United States Government is constructing a breakwater which will greatly improve the harbor here. Population, in 1890, 4087; in 1900, 4502. First settled in 1697 and incorporated as a parish in 1754, Rockport formed part of Gloucester until 1840. It then became a separate town and received its present name in place of the former one, Sandy Bay. Consult Marshall, *History of the Town of Rockport* (Rockport, 1888).

ROCKPORT. A port and the county-seat of Aransas County, Texas, 159 miles southeast of San Antonio, on Aransas Bay, the terminus of the San Antonio and Aransas Pass Railroad (Map: Texas, F 6). Rockport has considerable trade in fish, oysters, game, and wool. Excellent bathing facilities give the town some reputation as a summer resort. Population, in 1890, 1069; in 1900, 1153.

ROCK PTARMIGAN. See PTARMIGAN.

ROCK RABBIT. See HYRAX.

ROCK SALT. See SALT.

ROCK SNIPE. An American gunner's name for the purple sandpiper (q.v.).

ROCK SOAP, or SAPONITE. A soft, clay-like, hydrated aluminum-magnesium silicate that is found massive, and is of a white or light gray color. It is greasy to the touch, adheres to the tongue, and is easily cut with a knife. It is used for crayons by painters.

ROCK SPRINGS. A city in Sweetwater County, Wyo., 258 miles west of Laramie, on the Union Pacific Railroad (Map: Wyoming, E 5). Coal is extensively mined in the vicinity. Population, in 1890, 3406; in 1900, 4363.

ROCK'STRO (properly, Rackstraw), WILLIAM SMYTH (1823-95). An English musical writer, born at North Cheam, Surrey. He studied at the Leipzig Conservatory under Mendelssohn, Plaidy, and Hauptmann. In London he taught piano and singing. After 1891 he lived in London, where he gave lectures at the Royal Academy of Music. He wrote a standard *Life of Handel*, and a biography of *Jenny Lind, the Artist*, in collaboration with Canon Scott-Holland, and composed a sacred cantata, *The Good Shepherd* (1886), a ballet, *Flora's Path* (1891), overtures, and songs. He was an authority on ecclesiastical music.

ROCK-SWALLOW. See CRAG-MARTIN.

ROCK TROUT. A family of carnivorous sea-fishes (Hexagrammidæ) of the North Pacific. They are mostly of large size, live in kelp about rocks, and furnish good food, although their flesh and bones have a greenish tinge, whence they are sometimes called 'greenlings.' One species of great importance in the Aleutian Islands among several related Alaskan 'greenfish' is the so-called 'Atka mackerel,' which is about 18 inches long, is handsomely colored, exceedingly numerous, and of excellent food qualities. The best known of these fishes, however, is the bodieron (q.v.).

ROCK'VILLE. A city in Tolland County, Conn., 15 miles northeast of Hartford, on the Hockanum River and on the New York, New

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Haven and Hartford Railroad (Map: Connecticut, F 2). The Hockanum River makes a total descent of more than 250 feet through Rockville, affording excellent water-power. The industrial establishments include cotton and woolen mills, silk mills, knitting mills, envelope factories, etc. There are high school and public libraries. Settlers came to the vicinity of Rockville as early as 1721, but the village proper dates from about 1840. It was chartered as a city in 1889. Population, in 1890, 7772; in 1900, 7287.

ROCKWEED. See PHÆOPHYCEÆ; SEAWEED.

ROCK WREN. A singular little wren (*Salpinctes obsoletus*) of the Southwestern United States, which lives among the loose rocks of the mountain sides, where it places its large globular nest upon a ledge or within some crevice. It creeps and skips about with the furtive activity of a wild mouse, and in spring utters a loud, sweet, and beautiful song, somewhat like that of the mocking wren. Consult Coues, *Birds of the Colorado Valley* (Washington, 1878).

ROCKY MOUNTAIN LOCUST. See LOCUST.

ROCKY MOUNTAINS. A name here used to indicate the assemblage of mountain ranges which form the 'backbone' of North America. They begin at the south in Central Mexico, and extend northward across the United States and Canada to near the coast of the Arctic Ocean. On the east they are bordered from near Vera Cruz, Mexico, to the valley of the Mackenzie, by the Great Plateaus, or Great Plains as more commonly termed; and on the west, within the United States, by the Great Basin region which reaches from the head of the Gulf of California northward into Canada, and separates them from the Sierra Nevada and Cascade Mountains. The west border in Canada is less well known and as seems probable less sharply defined than is the portion just referred to, but may be taken at least provisionally as coinciding with the west border of the Gold Mountains of Canada.

The unsatisfactory condition of the nomenclature at present applied to the larger physiographic features of North America is illustrated above by the rather vague limits it is necessary to assign to the Rocky Mountains. The same condition is also shown by the fact that in Canada the term Rocky Mountains is restricted to the east range of the series of uplifts to which it is applied in the United States. To the west of the range thus designated, in Canada, and separated from it by a broad valley some 700 miles long, trending north and south, are the Gold Mountains, consisting principally of the Selkirk, Purcell, Columbia, and Caribou ranges. The term 'Canadian Rockies' is in current use, however, and includes all of the mountains in Canada, which are a direct northward continuation of the Rocky Mountains of the United States.

To the south of the United States the Rocky Mountains include the tableland of North-central Mexico, with its numerous rugged mountain ranges and intervening valley, all of which trend in a generally north and south direction.

The length of the Rocky Mountain chain from north to south is some 4000 miles, and its width between 400 and 500 miles. Within its borders are several mountain systems, as will be shown below, and a large number of individual ranges, together with several large plateaus, numerous valleys, 'parks,' cañons, etc., as well as multitudes of peaks, ridges, mesas, and buttes. In fact, it contains typical representatives of nearly every known topographic form. Considered in reference to origin, the topographic forms mentioned include elevations produced by the upheaval, folding, and faulting of sedimentary and other rocks, and also mountains due to volcanic eruptions, and still others produced by igneous intrusions, and an endless array of secondary features resulting from erosion or earth sculpture. One of the most conspicuous features of the chain, and one which has been used as a basis for dividing it into two portions, is the presence in Wyoming of a broad plateau trending east and west, known as the Laramie Plains. This plateau, with a general elevation of about 7000 feet, reaches from the Grand Plateau in the east nearly to the Great Basin in the west and separates the northern from the southern Rockies. This great 'pass' was chosen for the route of the Union Pacific Railroad, the first of the several transcontinental railroads now in operation. The several ranges composing the southern Rockies are for the most part arranged with their larger axes in a generally north and south direction, while the trend of the northern Rockies, as well as of their component ranges, is in general northwest and southeast.

Within the United States the portion of the Rocky Mountains to the north of the Laramie Plains has been termed the Stony Mountains, a revival of the name applied to them by Lewis and Clark, during their historic explorations in 1804-06; and the portion of the southern Rockies, situated principally in Colorado, northern New Mexico, eastern Utah, etc., has been designated as the Park Mountains. These two systems of ranges are the best known portions of the chain of which they form a part, and together with the southern portion of the Canadian Rockies must of necessity be taken as representative of its entire extent.

The Stony Mountains contain among their leading topographic features many important mountain ranges. In Wyoming the representative uplifts are: The Big Horn range, which, extending from near the centre of the State about 150 miles northward, ends in Montana. It is due principally to a single great upward fold in the rocks; the east slope is precipitous and the west slope gently inclined. The crest line has an elevation of from 8000 to 13,000 feet, and Cloud Peak, the culminating point, rises 13,165 feet above the sea. The Wind River range, in the west-central part of the State, presents a fine series of rugged peaks along its crest, at least a dozen of which have elevations in excess of 11,000 feet, the highest being Fremont Peak, 13,790 feet. The Teton range, near the northwest border of the State, is the boldest and probably the finest of the series, and culminates in the Grand Teton, a spine-like peak, rising 13,691 feet above the sea and 7000 feet above Jackson Lake, from which it may be seen to the greatest advantage. The Wind River, Teton, and other neighboring ranges, situated principally in northwest Wyoming, rise from a region some 15,000 square miles in area, which has a general elevation in excess of 8000 feet and is only exceeded in extent among the regions of similar elevation in North America by the central part of the Park Mountains. From

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this mountainous plateau of Wyoming, and supplied principally by the melting of the snow on the lofty ranges, the Yellowstone River flows eastward to join the Missouri, and the Snake River flows westward and unites with the Columbia; the many head-branches of these two important waterways adjoin along the continental divide. In central Idaho there is a great region of sharp, serrate peaks, the character of which is expressed by the name of the main or Sawtooth range, by estimate about 13,000 feet high. Topographically this rugged region extends northwest and is known in part as the Bitter Root and the Cœur d'Alêne Mountains, which, although not remarkable for their height, are of great extent and important on account of their mines, forests, and fine scenery. In Montana there are also several distinct and important ranges, among which there are not less than 23 peaks that exceed 10,000 feet in height above the sea and rise from 6000 to 8000 feet above the neighboring valleys.

To the east of the Big Horn Mountains and separated from them by a portion of the Great Plateaus, 150 miles wide, are the Black Hills, which in a general view are included in the Rocky Mountains. These hills are due to a dome-like elevation of the generally horizontal rocks underlying the Great Plateaus, measuring about 80 by 160 miles, which if uneroded would have a height of some 7000 feet above the surrounding plain. Erosion has cut deeply into the uplift, however, and produced a rugged topography, especially in its central part, where granitic rocks are exposed. The culminating summit, Harney Peak, has an elevation of 7216 feet and rises about 2700 feet above the surrounding plain.

The Park Mountains, situated to the south of the Wyoming Plateau, are composed of many distinct ranges having a north and south trend, to which, however, a marked exception is furnished by the Uintah range in southwest Wyoming and northeast Utah, which consists of a deeply dissected east and west fold or broadly uplifted plateau. Intervening between several of the adjacent ranges, especially in Colorado, there are wide, nearly flat-bottomed valleys which owe their leading characteristics to the depth of the deposits of débris swept into them from the bordering uplands by streams and the wind. These valleys are known as 'parks' and suggested the name for the mountain system in which they occur. Typical examples are furnished by North, Middle, South, and San Luis parks in central Colorado, the broad generally level floors of which have elevations ranging from 7000 to 8000 feet.

Among the numerous ranges of the Park Mountains in Colorado are the Front or Colorado range, in view from Denver, the Saguache, Elk, San Juan ranges, etc. A conspicuous feature in the relief is the generally great elevation and the large number of lofty summits. The area above an elevation of 10,000 feet is much larger than any other region with a similar altitude in North America. Among the host of magnificent mountain peaks there are more than 30 which exceed 14,000 feet, but their height is seldom fully appreciated, owing to the elevation of the neighboring valleys, which reduces their *visual height* to about one-half of their total elevation above the sea. Of this multitude of magnificent individual mountains or peaks, as many of them are termed, the best known and perhaps most representative are, with their elevations expressed in feet: Gray's Peak, 14,341; Mount Harvard, 14,325; Mountain of the Holy Cross, 14,006; Mount Lincoln, 14,297; Long's Peak, 14,271; Mount Princeton, 14,196; Pike's Peak, 14,108; Uncompahgre Peak, 14,289; and Mount Yale, 14,187. In the opinion of many observers the most magnificent mountain mass in the Park Mountains, largely on account of its isolation, is Sierra Blanca, in southeast Colorado, 14,465 feet.

The Park Mountains extend west into Utah and there include the bold Wasatch range, with a culminating summit nearly 12,000 feet above the sea. This range is in view from Ogden and Salt Lake City and presents a wonderfully bold escarpment to the west, which sharply defines the west border of the Rocky Mountains for a distance of some 200 miles.

To the southwest of the as yet indefinitely determined border of the Park Mountains is a series of high plateaus termed collectively the Colorado Plateaus, situated principally in Arizona, western New Mexico, and southern Utah, which have elevations ranging from 7000 to 8000 feet, and have been deeply dissected by the Colorado River and its tributaries. The explorations of J. S. Newberry, J. W. Powell, and C. E. Dutton in this land of remarkable cañons have made it one of the best known and to geologists and geographers most instructive portions of the Rocky Mountain region.

In New Mexico the mountains are lower than in Colorado, and the several ranges and numerous isolated volcanic mountains are separated by broad deeply filled valleys. These same characteristics of the relief extend southward into Mexico, where the Rocky Mountains terminate and are succeeded by a series of lofty volcanoes, and by the western portion of the Antillean cordillera, in which the major structural features are folds and faults, trending east and west.

Geologically the Rocky Mountains present a wide range in reference especially to the age of the rocks and to the structure of the numerous ranges. All of the larger divisions of geological history from the Archæan to recent times are represented. Granite, gneiss, schist, and related rocks usually referred to the Archæan occur especially in the axial portion of many of the ranges, as the Front or Colorado range, the Saguache, etc., in Colorado, the Black Hills, Big Horn, Teton, etc. The older recognized sedimentary rocks belong to the Algonkian period and consist largely of quartzites. In the Lewis and Livingston of Montana rocks of this age have yielded interesting remains of large crustaceans related to *Eurypterus*, which belong to the oldest known fauna of the earth. In sandstone of Ordovician (Lower Silurian) age near Cañon City, Colo., the oldest known fossil fishes have been found. Carboniferous rocks, principally marine limestone, occur widely throughout both the Stony and Park Mountains. At several localities in Colorado and Wyoming rocks of Jura-Trias age have yielded large quantities of bones belonging to gigantic extinct reptiles. Marine sediments of Cretaceous age, particularly in Montana, are frequently crowded with beautifully preserved shells, and particularly a great variety of cephalopods. Tertiary rocks, consisting principally of the sediments of lakes and occurring for the most part in the valley, contain the bones of many genera of extinct mammals, some of

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them of large size and remarkable character. In beds of similar age, consisting largely of volcanic dust, at Florissant, Colo., immense numbers of fossil insects have been obtained, and near Green River in Wyoming soft shales are crowded with the remains of fishes. Fossil plants, particularly of Lower Cretaceous, Jurassic, and Tertiary times, are also abundant. Valuable coal seams of Cretaceous and Tertiary age occur at many localities.

One of the most remarkable facts concerning the geological structure of the Rocky Mountains is the presence of a series of abrupt folds along their eastern border in which the horizontal strata, several thousand feet thick, underlying the Great Plateaus, are bent upward. Remnants of these same beds spared by erosion occur in several of the ranges to the west of the Front range, at an elevation of 5000 or 6000 feet above the portions not affected by mountain-building forces. At many localities along the east base of the Front range, from New Mexico northward far into Canada, the abrupt folding of the rocks is shown by the nearly vertical position of the eroded border of the strata remaining. At times the folds were overturned eastward, so that the beds in their eroded basal portions dip westward. In northern Montana a still more intense movement resulted in the fracturing of the rocks in an overturned fold, producing a nearly horizontal fault or thrust plain, in connection with which, as reported by Bailey Willis, Algonkian rocks were carried seven miles eastward and rest on Cretaceous strata.

In general the various ranges composing the Rocky Mountain chain are due to upward folds or anticlinals in sedimentary and igneous rocks, and the elevation of plastic magmas now represented by granite, gneiss, schist, etc., in their central portions. In general, also, as shown by the north and south trend of the longer axes of the folds, the direction in which the force acted which caused the rocks to bend was east and west. The principal movements which upraised the mountains occurred at the close of the Mesozoic, as is shown by unconformities between Mesozoic and Tertiary beds.

The upheaval of the mountains was followed by erosion. Nearly all of the scenic features which now attract the eye are due to the work of streams and glaciers which have deeply sculptured the upheaved mountain blocks. The broad valleys, including the parks of Colorado, etc., are due to the upraising of their bordering mountains; but the cañons, such as the Yellowstone, Arkansas, Colorado, and other streams flow through, are the result of abrasion by the débris-charged rivers themselves. The infinitely varied secondary valleys and cañons and the multitude of gorges, gulches, amphitheatres, and other similar incised features of the relief are due to erosion, while the countless mesas, buttes, pinnacles, etc., which rise above the general level of the surrounding country are remnants of ancient uplands spared by the erosive agencies. Erosion or earth sculpture has also brought out the characteristic features of the Black Hills in which the more resistant rocks stand in relief and the weaker beds underlie valleys, and has given to the several regions of 'bad lands' their unique topography. In addition to the numerous ranges due to lateral pressure and consequent upward folding there are many elevations due to volcanic agencies. Mountains built by volcanic eruptions are numerous in Arizona and New Mexico. To this class belong San Francisco Mountain and Mount Taylor, situated farther east, in sight of which there are a large number of 'volcanic necks' exposed by the removal of the craters which once inclosed them. East of the Front range in New Mexico, and well out in the Great Plateaus, there are a number of conspicuous volcanic craters, of which the leading example is Mount Capulin, 2750 feet high above the surrounding plain, and with a crater on its summit nearly a mile in diameter. The Spanish Peaks, in southeastern Colorado, furnish admirable examples of the deep erosion of large volcanic mountains. Colorado, Wyoming, and Montana are almost wholly without recent volcanic craters, but in Western Wyoming and extending across southern Idaho are the basaltic lavas of the Snake River Plains, one of the most wonderful exhibits of its kind in the world, associated with which there are numerous volcanic craters. In the region of Yellowstone Park there are great accumulations of rhyolitic lava, of older date than the basalts of Idaho, but still retaining some of their volcanic heat, as is made manifest by the numerous hot springs and geysers. Associated with volcanic eruptions is the injection from below of molten or plastic magmas into the rigid rocks composing the outer portion or 'crust' of the earth. These intrusions in part occupy fissures and form dikes, but at times were forced between stratified beds and produced intruded sheets of igneous rocks, perhaps many scores of square miles in area, and under other conditions formed cistern-like intrusions termed laccoliths, which raised the rocks above into domes. In the Rocky Mountains there are numerous examples of each of these varieties of igneous intrusions, many of which have been laid bare by erosion. Of these the most remarkable are the laccoliths forming the Henry Mountains in southern Utah, where several intrusions in previously horizontal rocks elevated domes measuring three to five miles in diameter and from a few hundred to fully 7000 feet high. These mountains furnished the type of a class of uplifts not previously recognized. Other similar laccolithic mountains occur in southwest Colorado, and about the Black Hills in South Dakota, and have been recognized elsewhere.

Perennial snow banks and miniature glaciers occur in the mountains of Colorado and on the Teton range in Wyoming. In northern Montana small glaciers are frequent, and in the Canadian Rockies form a conspicuous feature in the magnificent scenery. The best known is perhaps Illicilliwaet glacier, near Glacier House, on the line of the Canadian Pacific Railroad. Other glaciers occur in the higher portions of the mountains throughout Alberta. The glaciers are all of the Alpine type, and from Montana northward are remnants of great ice sheets which covered the mountains during the Glacial epoch. Many of the more conspicuous features in the North Rockies, such as the deep, steep-sided valley, with rounded or U-shaped bottoms, numerous lakes and side alcoves from which the streams descend in cascades, are due to the former glaciers which flowed away from the several ranges. The summit portions of the Big Horn, Teton, and other ranges in Wyoming are glaciated, as is also a large area in the region of great mountains in Colorado. Nearly all of the numerous and fre-

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quently exceedingly beautiful lakes of the Rocky Mountain region are due to the work of glacial ice. Those near the crests of the higher ranges are, for the most part, rock-basins, while those at lower altitudes, and especially the long, narrow lakes in the larger valleys, are held by morainal dams.

The chief industry throughout the Rocky Mountains from Alaska to Mexico is mining, and silver, gold, copper, and coal are the leading products. Next in importance is stock-raising, and particularly cattle-raising, for which the nutritious bunch grass, growing mostly below the lower limit of the forests, furnishes abundant nourishment. In recent years, however, overgrazing has greatly injured the natural pasture lands south of Montana. Agriculture is of local importance, and with certain exceptions, mostly in western Idaho and adjacent portions of Washington, is dependent on irrigation. All through the region from the central part of British Columbia to Central Mexico there are ranches, mining camps, villages, and cities. At present seven railroads, six in the United States and one in Canada, cross the chain, and another to the north of the Canadian Pacific Railroad is projected. In Mexico the main avenues of traffic run north and south through the intermontane valleys, as is shown by the Mexican Central Railway, which connects Ciudad Juarez, opposite El Paso, Texas, with the City of Mexico, a distance of over 1000 miles. These several railroads and their numerous branches make accessible nearly all portions of the Rocky Mountain region, except the extreme north and the excessively rugged western portion of the tableland of Mexico. At the far north, however, a new centre of industry has developed in the Klondike region. The forests of the mountains are economically important, not only as a source of lumber, but also because they serve to regulate the flow of streams used for irrigation. For these reasons 21 forest reserves, with a total area of over 38,000 square miles, have been established in the portion of the Rocky Mountains belonging to the United States, and similar provisions have been made in Canada.

Among the economic assets of the Rocky Mountains should also be included their magnificent scenery and healthful and invigorating climate. Although thousands of people visit them each year in search of health and recreation, the great benefits to be reaped in these directions are as yet only partially appreciated. The portions most attractive to travelers are the Yellowstone National Park and the Grand Cañon of the Colorado, each of which is unrivaled in its class.

FLORA. The Rocky Mountains constitute one of the great floral regions of North America. With the exception of southern New Mexico and Arizona, which belong botanically to the Mexican Plateau, and the extreme northern portion, whose flora is still but little known and merges with that of the Pacific Coast, the flora of the whole Rocky Mountain region is essentially homogeneous at corresponding altitudes. On the other hand, the region is markedly different from the Eastern or Appalachian region. Scarcely 20 per cent. of the Rocky Mountain plants are found in the East, and of these most belong to the species common to both hemispheres. The Rocky Mountain flora, however, includes numerous species found in the contiguous regions, and is especially allied to that of the California or Sierra Nevada region. Within certain altitudes forests occur throughout the Rocky Mountain region. The upper limit of tree growth, or cold timber line, rises toward the south, having an elevation of 9000 feet on the international boundary and 11,000 to 12,000 feet in Colorado. In the Stony and Park Mountains and thence southward there is also a lower limit of tree growth, determined mainly by lack of humidity. As far north as Idaho and southern Wyoming the larger valleys are below this dry timber line, but in Canada the forests are continuous across mountain and valley. The forests of the whole region are overwhelmingly coniferous, and with the exception of two alpine junipers none of the coniferous trees are common to the Appalachian region, though the latter has closely allied corresponding species, some of which have been erroneously identified with those of the Rockies. There are about 10 pines, and the most characteristic tree of the whole region is the Western yellow pine (*Pinus ponderosa*). The nut pine (*Pinus edulis*) and the *Pinus Chihuahua* are the chief species confined to the southern portion, while the mountain pine (*Pinus monticola*) and the black pine (*Pinus Murrayana*) are found chiefly in the north. Of the spruces the *Picea Engelmanni* is the most common throughout the region, though generally seeking higher altitudes (nearly 9000 feet in the south). Other spruces, notably the *Picea Columbiana*, are more common in the north, and a northern habitat is also preferred by the firs (*Abies grandis* and *nobilis*), the Western Hemlock (*Tsuga Mertensiana*), and the tamarack (*Larix Americana*). Shrubby conifers, such as junipers, are found chiefly in the arid southwestern ranges and above the timber line. The deciduous forests of the Rocky Mountains are of small extent and poor in species. There are six species of oak, but all rather small and scrubby, and the other deciduous tree families are similarly ill represented. Sycamores, the New Mexican locust, and mulberries grow in the south, and the rivers throughout the region are lined with cottonwood, balsam poplar, and willows. On the level plateaus the predominating flora is of the sage-brush type, represented by the genera Artemisia, Atriplex, Eurotina, and Bigelovia, but in the southwest the plains are nearly desert, with the characteristic desert flora. Above the timber line the Alpine flora closely resembles the flora of the Arctic region. Among all the flowering plants of the Rocky Mountains the families best represented are in the order named, the Compositæ, Gramineæ, Papilionaceæ, Cyperaceæ, Ranunculaceæ, Cichoriaceæ, Polygonaceæ, Onagraceæ, and Umbelliferæ. Of these the first two together include about 25 per cent. of all the species.

FAUNA. It was the opinion of the earlier students of animal life in North America that the Rocky Mountains were the central and essential part of a peculiar fauna representing the 'Central' zoögeographical region embracing the whole elevated territory between the Great Plains and the base of the Sierra Nevada. It appears, however, that such a distinction does not exist; that the Rocky Mountains are peculiar only in such features as depend upon altitude and are correlated with climate and vegetation as locally determined by height above the sea and consequent low temperature. The fauna of all North

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America is remarkably diffuse and uniform, so that it is considered indivisible by any well-marked distinctions; nevertheless certain zones of life roughly bounded by summer isothermal lines have been recognized as Boreal, Hudsonian, Canadian, Alleghanian, Carolinian, etc., in succession from north to south. These are reproduced in the Rocky and other high ranges of the West. The height above the general base-level at which such life-zones will be found depends upon the latitude. Thus at the northern extremity of the range, near the mouth of the Mackenzie, not only the summits but the base of the range are within the 'Boreal zone;' but at the southern extremity in New Mexico, the base exhibits a Carolinian or even warmer type of fauna, and one must climb 13,000 or 14,000 feet to find upon the peaks Arctic weather, and Arctic plants and animals. It is in these restricted summit areas that one finds the animals peculiar to the region; in the valleys and parks there is little that is distinctive. It is only when one has risen considerably that local specialties begin to appear. Thus in a medium latitude (say Montana) at about 9000 feet, one rises above the sage-brush, the Douglas fir, and the black pine, with their host of valley and plain animals, and into forests of Alpine fir, white-bark and Engelmann's pines, which indicate a climate equivalent to that about Hudson Bay. Here are breeding snow-birds (Junco), the nut-cracker, Canada jay, kinglet, and other northerly birds. This zone extends to the timber line and forms the normal upward limit of the wapiti, moose, and mule deer; the grizzly and black bears; the wolverine, many mice, squirrels, and the smaller carnivores that prey upon them. At and near the timber line one begins to find among the stunted trees and plants animals which do not come lower down, but spend their lives altogether there and upon the treeless summits above it, and these are the really characteristic mountain animals; and yet with very few exceptions (the sewellel is most conspicuous) they are the same as those of sub-arctic America generally or of the high ranges of the Pacific Coast, or different only in specific details. Such among the larger animals are the bighorn, and the Rocky Mountain white goat (qq.v.). The former is practically a circumpolar form, and the latter is numerous at sea-level in the far north, but is scarce in the United States. The bighorn is still to be found as far south as San Francisco Peak in Arizona. Along with these two game animals are several small ones peculiar to the heights. One of the most characteristic is the pika (*Lagomys princeps*); another is the lemming mouse (*Phenacomys orophilus*), an Arctic form that burrows in the moss of the Alpine meadows; and a third the whistler, a marmot (*Arctomys*), inhabiting these heights only toward the north. This, with a weasel, which descends in winter, when the small animals are hibernating or living upon their stores in underground burrows, and when the sheep have migrated below the snow line in order to find browse and pasturage, constitutes the list of peculiarly Rocky Mountain mammals. On the heights, however, breed certain birds, as species of ptarmigan, the rosy finches (*Leucosticte*), and an occasional golden eagle or great owl.

The general list of animals of the lower levels of the Rocky Mountain region is a very long one, and includes many which are distinguished as local or geographic races or subspecies of more widely distributed forms. The bison, pronghorn, and the white-tailed deer range throughout the valleys and climb the heights to a considerable altitude in summer, and in the north caribou are common; but the bison is extinct, the wapiti remains only from northwestern Wyoming northward, and the pronghorn is scarce. Among the carnivores, grizzly and black bears, the puma, wildcat, wolverine, otter, marten, fisher, long-tailed weasel, black-footed ferret, badger, striped and spotted skunks, red fox, kit fox, raccoon, and cacomixl make a long list attractive in early days to trappers. An extensive catalogue of rodents includes a large number of local species of mice, wood-rats and voles, the beaver (now greatly reduced), muskrat, and several hares, one or two of which are peculiar; and many species or races of burrowing 'gophers,' and of arboreal and terrestrial squirrels. The same principles apply to the birds, of which about 400 species and varieties have been recorded as occurring in the central Rocky Mountain region, of which about 250 are known to breed there. A goodly list of reptiles and batrachians and fishes may be compiled, the last group distinguished by the predominance of salmonoids. Several species of the Pacific coast salmon regularly reach the Rocky Mountains by ascending the Columbia, Fraser, and more northerly rivers. Insects abound and this region is the headquarters of the locust tribe in America.

In general it may be said that what is most peculiar in the fauna of the Rocky Mountain region has been derived from the north, and leads back to the Glacial period, when the pre-glacial boreal fauna was pressed southward by the slow cooling and final refrigeration of Canada. When the ice slowly melted under the restoration of warmer conditions a large representation of this Arctic fauna found upon the summits a local continuance of the cool climate favorable to it, and has remained there, often in the south isolated upon peaks which it cannot leave, and where it has survived in limited colonies cut off from the north. This history (which was also that of the Coast ranges) and the barriers afforded by the breadth of high, dry plains to the eastward, account for the greater likeness of the Rocky Mountain fauna on the whole to the Pacific than to the Atlantic side of the continent.

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ROCKY MOUNTAIN SHEEP. See BIGHORN.

ROCKY MOUNTAIN SUBREGION. A zoögeographical subdivision of the Nearctic region, embracing the mountainous country between the North American plains and the sum-

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mits of the Sierra Nevada and northern Coast ranges.

ROCKY MOUNTAIN TROUT. See DOLLY VARDEN TROUT.

ROCKY MOUNTAIN WHITE GOAT. A goat-antelope (*Oreamnus montanus*) of the higher mountains of Western North America. The outer hair is long, especially about the fore quarters, and has beneath it a woolly underfur. It stands about three feet high at the shoulders, which are somewhat arched or humped, while the head is carried low. The nose is hairy, there is a beard, and the horns, present in both sexes, are slender, smooth, backward-curving, eight to ten inches long, and black, which is also the color of the small hoofs. The nearest relatives of this animal are the chamois and serow, but its appearance is very different from that of either. Its home is the summits of the mountains from the 'high sierras' of California and the central Rocky Mountains to Alaska, but it has become rare south of British Columbia. Its long silky coat, which the Indians were wont to weave into curious blankets, and its pure white and highly protective color, indicate a snowy habitat, and this animal is an inhabitant of the glacial peaks and the great snow-fields alone, rarely coming down even as low as the timber-line, but finding its foliage among the alpine pastures that border the glaciers. It climbs with astonishing agility, picks its way along cliffs and ledges where the gales blow the snow away as fast as it falls, or feeds upon the highest grassy slopes, so steep that they are last to hold the snowfall of winter and earliest to be swept clean by the spring avalanches. It moves in beaten trails, often the only means the hunter has of following it, and in some narrow places the treading of countless hoofs for countless generations has actually worn deep paths in the solid granite. Their flesh is good eating, and their hides command a large price when well made into robes or rugs. Two kids are usually produced in the spring and remain with the parents until the next spring, forming a family party which moves about in company, but no large flocks are ever found. Consult: Stone and Cram, *American Animals* (New York, 1902); Baillie-Grohman, *Fifteen Years' Sport . . . in the Hunting Grounds of Western America* (London, 1900). See Plate of GOAT-ANTELOPES.

ROCO'CO (Fr., apparently coined from *rocaille*, rockwork, from *roche*, ML. *roca*, rock). The name given to a late and fantastic branch of the Renaissance which prevailed in France, Germany, and other parts of Central Europe during the latter half of the seventeenth and the first half of the succeeding century. It was really a sub-species of the Barocco style of architecture and decoration, which took but slight hold in Italy. It played extravagant tricks with design, showing no restraint in its caprice: fond of rustic work and outdoor effects, it reveled in rockwork, fountains, gardens, pavilions, and villas. It broke all the rules of proportion, design, and composition drawn up by the purists of the Renaissance, and aimed at broken and curved lines and surfaces, irrational details, and incongruous masses.

ROCROI, rō'krwä'. The capital of an arrondissement in the Department of Ardennes, France, 15 miles northwest of Mézières, situated on an extensive plateau 1300 feet above the sea, surrounded by the Forest of Ardennes (Map: France, L 2). Population, in 1901, 2176. It is memorable for the victory gained by the Duke of Enghien (the Great Condé) over the Spaniards, May 19, 1643, in which battle a century's reputation for invincibility enjoyed by the Spanish infantry was destroyed.

ROD (AS. *rōd*, OHG. *ruota*, Ger. *Rute;* possibly connected with Lat. *rudis*, staff, *radius*, rod, staff, spoke, semidiameter, Skt. *rudh*, to grow). A measure of length equivalent to 5½ yards, also called a pole. In surveying (q.v.), an instrument used in taking levels. See ENGINEERING INSTRUMENTS.

ROD, rōd, EDOUARD (1857—). A French author, born at Nyon, Switzerland. He studied philology at Bonn and Berlin, went to Paris and became (1884) editor of *La Revue Contemporaine*. In 1887 he was chosen professor of comparative literature at Geneva, but he soon resigned, returning to Paris and literature. In 1899 he visited the United States on a lecture tour. His first novels are naturalistic, *Côte-à-côte* (1882), *La femme de Henri Vanneau* (1884). With *La sacrifiée* (1892) Rod passed under the influence of Tolstoy, though affected somewhat by Renan and Bourget. This appears most clearly in *Michel Tessier* (1893-94), but also in *Les rochers blancs* (1895), *Père et fils* (1897), *Pastor Naudié's Young Wife* (trans. 1899), and *Au milieu du chemin* (1900). His critical work is represented by such books as *Dante et Stendhal* (1889), *Les Allemands à Paris* (1880), and *Etudes et nouvelles études sur le XIXème siècle* (1888 et seq.).

RODAS, rō'dȧs. A town of the Province of Santa Clara, Cuba, 55 miles west of the city of that name. Its chief productions are sugar and fruits. Population, in 1899, 3390.

RODBERTUS, rōd-bĕr'tụs, JOHANN KARL (1805-75). A German economist, founder of the scientific or conservative school of socialism. He was born August 12, 1805, in Greifswald, where his father was a professor of Roman law. He studied law at Göttingen and Berlin, and served from 1827 to 1832 in the Prussian justiciary. By 1837 he had formulated his social platform, and in that year published *Die Forderungen der arbeitenden Klassen*. Elected to the National Assembly in 1848, he was Minister of Education in the Auerswald-Hansemann Ministry for a fortnight, and in 1849 was a leader of the Left Centre. The last twenty years of his life were spent in retirement. Socialism, as defined by Rodbertus, was to be a gradual evolution, hence his acquiescence in a monarchy, and his break with the Democrats as a political party. He regarded the social question as a purely economic one. His principal doctrines are these: The workman's share of the nation's industrial income tends constantly to decline; land rent and interest are the result of the exploitation of the working classes; the present shares in the distribution of wealth—rent, profits, interest, and wages—are not entirely the result of permanent, universal economic forces, but the result of historical evolution and the prevailing legal system; financial and commercial crises are due to a non-adjustment of production and consumption; the laborer's purchasing power is

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small and the capitalist and landlord classes, instead of increasing their consumption of luxuries, invest their savings in new factories, and in otherwise increasing the means of production, with the inevitable result that commodities of common consumption are produced in excess—the great cause of crises. Rodbertus died in 1875. His works include: *Zur Erkenntnis unserer staatswirthschaftlichen Zustände* (1842); *Soziale Briefe*, addressed to Julius von Kirchmann (1850-51); *Der Normalarbeitstag* (1871); and *Beleuchtung der socialen Frage* (1875). His statement of his theory of crises, contained in his *Soziale Briefe*, has appeared in an English translation under the title of *Overproduction and Crises* (New York, 1898). Consult the sketch in Stegmann and Hugo, *Handbuch des Sozialismus* (1897); Jantsch, *Rodbertus* (Stuttgart, 1899).

RODD, Sir JAMES RENNELL (1858—). An English diplomatist and verse writer. He was educated at Balliol College, Oxford, where he won the Newdigate prize with a poem on Sir Walter Ralegh (1880). Entering the diplomatic service (1883), he held various appointments at Berlin, Athens, Rome, and Paris. In 1893 he was placed in charge of the British agency at Zanzibar and was present at the skirmishes at Pumwani and Jongeni. In 1894 he was transferred to Cairo, as principal secretary to the British agency in Egypt. In 1897 he was sent on the important mission to King Menelik of Abyssinia. For his distinguished services he received a C.B. on his return and was knighted in 1899. His volumes of verse comprise *Songs of the South* (1881), *Poems in Many Lands* (1883), *Feda and Other Poems* (1886), *The Unknown Madonna* (1888), *The Violet Crown and Songs of England* (1891), and *Ballads of the Fleet* (1897). These books form a body of fluent verse often very beautiful. We may cite "The Daisy," "Good Bye," and the various domestic pieces in the *Songs of England*. In prose, Rodd has published *Frederick, Crown Prince and Emperor*, a biography (1888), and *Customs and Lore of Modern Greece* (1892).

RODE, rôd, JACQUES PIERRE JOSEPH (1774-1830). A French violinist, born at Bordeaux. He studied under Fauvel in his native place, and, later, under Viotti at Paris. At the opening of the Conservatoire, in 1794, he was appointed professor of the violin. In 1800 he was appointed solo violinist to Napoleon. In 1803 he went with Boieldieu to Russia, where he remained for five years as solo violinist to Alexander I. Afterwards, at Vienna, Beethoven wrote for him the *Romance*, Op. 50. He went back to Paris in 1828, but was unfavorably received and made his final withdrawal to Bordeaux. He wrote 13 violin-concertos; the important and much-used "24 caprices en forme d'études, dans les 24 tons de la gamme"; études; and 3 books of violin duos. His compositions are still highly regarded by violinists. He died at Bordeaux.

RODENBERG, rō'den-bĕrk, JULIUS (1831—). A German author, born of a Jewish family named Levy, at Rodenberg, in Hesse. He studied law at Heidelberg, Göttingen, Marburg, and Berlin, but devoted himself to literature and to travel, and edited, at Berlin, first the *Bazar* and then the *Salon*, until, in 1874, he founded the important *Deutsche Rundschau*, of which he remained editor. He published in verse, *Sonnette für Schleswig-Holstein* (1851), *König Haralds Totenfeier* (1853; 3d ed. 1856), and *Lieder und Gedichte* (1863; 5th ed. 1880); sketches of life and travel; several romances, *Die neue Sündflut* (1865), *Von Gottes Gnaden* (1870), *Die Grandidiers* (2d ed. 1881), *Herrn Schellbogens Abenteuer* (1890); and a biography of Franz Dingelstedt (1891). Consult the memoirs, *Erinnerungen aus Jugendzeit* (1899).

RO'DENBOUGH, THEOPHILUS FRANCIS (1838—). An American soldier and author, born in Easton, Pa., and educated in private schools and at Lafayette College. He was appointed second lieutenant of the Second United States Dragoons in 1861; was on duty in the Cavalry School of Practice, and served in the campaigns of the Army of the Potomac. He lost his right arm at Winchester. He served after the war as inspector-general in Kansas and as major of the Forty-second Infantry. He was retired in 1870 as colonel of cavalry, because of wounds received in line of duty. In 1871 he became deputy governor of the Soldiers' Home, Washington, D. C.; was assistant inspector-general of New York State (1888-90), and from 1890 to 1901 chief of the Bureau of Elections, New York City. He wrote *From Everglade to Cañon with the Second Dragoons* (1875), *Afghanistan and the Anglo-Russian Dispute* (1885), *Uncle Sam's Medal of Honor* (1886), *Autumn Leaves from Family Trees* (1892), and *Sabre and Bayonet* (1897). He contributed articles on military science to *The New International Encyclopædia*.

RODENTIA, rō-dĕn'shĭ-ȧ (Neo-Lat., from Lat. *rodentia*, nom. pl., sc. *animalia*, animals, from pres. part. of *rodere*, to gnaw; connected with Skt. *rada*, tooth). The largest known order of mammals, the rodents, or gnawers, containing 20 or more families comprising several thousand species, distributed throughout the world, possibly excepting Australia and New Zealand. The largest, the capybara, is not as large as a hog, while some, as the mice, are very small. The order is distinctively characterized by its dentition, especially by the total absence of canines and the paramount importance of the front teeth or incisors. These are usually two in each jaw, separated by a considerable vacant interval from the molars. They are very large, reach far back into the skull, and continue to grow from persistent pulps as fast as their tips, or cutting edges, are worn away. They are coated on the front with hard enamel, and as the softer dentine of the remainder of the tooth wears away more rapidly, the cusp of each tooth takes a chisel-like edge, and its sharpness is maintained. In some groups the molar teeth are also perennial, and grow from persistent pulps. Another interesting fact is that in many groups, such as that of the rats and mice, there are no milk-teeth. The molar teeth, of which there are usually three on each side, one in each jaw, have flat crowns with ridges of enamel, which make them highly effective as grinders. The stomach is simple; the intestines are very long; the cæcum is often large, sometimes larger than the stomach itself. The brain is not large, and that of some rodents is nearly smooth, but in many families exhibits a considerable degree of convolution. The rodents are not generally distinguished for sagacity, although some of them,

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as the beaver, exhibit remarkable instincts. They bear important relationships to mankind, chiefly as pests highly injurious to agriculture or obnoxious to the housekeeper; but some yield valuable furs, or are useful in other ways. The living rodents are grouped in two suborders, according to the arrangement of the incisor teeth. In the suborder *Duplicidentata*, which includes only hares, rabbits, and pikas, there are a pair of small accessory incisors in the upper jaw back of the functional pair. In the other suborder, *Simplicidentata*, there are only two incisors in each jaw. This suborder includes three sections: (1) Hystricomorpha, containing rodents with tibia and fibula distinct, a hairy muzzle, and 20 teeth; (2) Myomorpha, rodents with tibia and fibula united, a naked muzzle, and 16 teeth; (3) Sciuromorpha, rodents with tibia and fibula distinct, a naked muzzle, and 20 or 22 teeth. See HARE; PIKA; PORCUPINE; RAT; SQUIRREL.

FOSSIL RODENTS. The rodent order probably arose some time during the earlier Eocene in North America, as typical rodents are found in the Middle Eocene, and by the end of the Eocene period all the great groups of the order were differentiated. The probability is that the rodents arose from the early Insectivora. It is noteworthy that as yet no intermediate forms have been found to connect the two great rodent groups, the Simplicidentata and the Duplicidentata, and a diphyletic origin is possible.

The rodents very early underwent a remarkably wide geographical distribution and by the end of the Eocene they were represented in North and South America, Europe, Asia, and Africa, and some existing groups seem to have been much more widely distributed than at present. The Duplicidentata are represented at the base of the Miocene in both Europe and North America by the existing families Lagomyidæ and Leporidæ, and no extinct families are known. Of the Simplicidentata the squirrels occur first in the Upper Eocene of Europe, and later in the White River beds of the Lower Miocene of North America. The earliest of the beavers (Steneofiber) occurs in the White River formation and in the Miocene of Europe. The porcupine-like forms attained their greatest development in South America. The rats and mice first appear in the Upper Eocene of Europe in the genus Cricetodon, and in North America Eumys of the Lower Miocene is an early representative. Although nearly all the rodents have been quite small, there are notable exceptions in Megomys of the South American Pampæan formation, a form "nearly as large as an ox," and in *Castoroides Ohioticus*, a North American rodent which must have equaled the black bear in size. This animal has been erroneously described as a giant beaver, but its relationship to the porcupines is now known to be closer. Consult: Flower, *Mammals Living and Extinct* (London, 1891); Beddard, *Mammalia* (ib., 1902); Waterhouse, *Mammalia*, vol. ii. (ib., 1848); Coues and Allen, *Monographs of North American Rodentia* (Washington, 1877).

RODERIC (?-c.711). King of the Visigoths in Spain from 708 or 709 to 711. He became King after the overthrow and death of Witiza, and according to one account the sons of Witiza joined with some malcontent Visigothic nobles—among whom was a Count Julian—and summoned to their aid the Arab chief who had just finished the conquest of Mauretania. Others assert that the country groaned under the tyrannical government of Roderic, that his licentious behavior had disgusted many of his nobles, and that the people were ripe for a revolution when the Moslem invasion took place. Both are agreed as to the time and mode of the invasion; but the Arab historians brand Count Julian with treachery, as not only voluntarily surrendering Ceuta, the key to the country, but actually guiding the Berbers and Arabs under Tarik into Spain. A landing was effected at Algeciras in 711; and in spite of vigorous opposition from the Governor of Andalusia, Tarik marched on, routing Roderic's chosen cavalry, which had been sent to oppose him. Roderic hastened at the head of an army to oppose the invaders, who had been reenforced from Africa and by rebels. The two armies met near Jerez de la Frontera, and in July the decisive battle was fought. It is probable that the Christians would have been victorious but for the treachery of the King's Gothic enemies. The Saracens won a complete victory, which opened the way to the speedy conquest of Spain. Roderic's fate is unknown, and many legends have been current about his end. Consult Saavedra, *Estudio sobre la invasión de los Arabes* (Madrid, 1895).

RODERICK DHU, dōō. In Scott's *Lady of the Lake*, an outlaw chieftain, overcome and made prisoner by Fitz-James.

RODERICK RANDOM. A novel by Tobias Smollett (1748). The hero, a selfish bully, has adventures in many lands, during his hard life in the navy and on shore, some of which is autobiographical. Tom Bowling and Jack Rattlin are amusing naval characters, and the story, though coarse, is spirited and entertaining.

RODERIGO, rŏd'*e*-rē'gō. In Shakespeare's *Othello*, a Venetian, in love with Desdemona, and used by Iago to further his own purposes.

RODEZ, rō'dĕs' *or* rōō'-. The capital of the Department of Aveyron, France, situated on the crest and slope of a hill, on the north bank of the Aveyron, 148 miles northwest of Montpellier by rail (Map: France, J 7). Its streets are steep, narrow, winding, and dirty; but the promenades around the town are pleasant. The cathedral, with a lofty clock-tower, is a Gothic structure, dating from the thirteenth century. Other noteworthy buildings are the restored Romanesque Church of Saint Amans, the modern Church of the Sacred Heart, the bishop's palace, several mediæval houses, and the Renaissance Hotel d'Armagnac. There are ruins of a Roman amphitheatre and a restored Roman aqueduct supplies the city with water. A variety of woolen cloths are manufactured, cheese of a highly esteemed quality is made, and there is a large trade in cattle and mules. Rodez is the ancient Segodunum, the capital of a Gallic Arvernian tribe, the Rutheni, whence the mediæval Latin name, Rutena, and the modern name. It was the capital of the old County of Rouergue. Population, in 1901, 16,105.

RODGERS, rŏj'ĕrz, CHRISTOPHER RAYMOND PERRY (1819-92). An American naval officer. He was born in Brooklyn, and in 1833 entered the navy as a midshipman. He saw active service against the Seminole Indians in 1839-41, and in the Mexican War. From 1859 to 1861 he was commandant of midshipmen in the Naval Academy. At the beginning of the

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Civil War he was placed in command of the frigate *Wabash* and rendered his first important service at Port Royal (November, 1861). In March, 1862, he commanded an expedition to Saint Augustine and Saint Mary's River, and at the capture of Fort Pulaski had charge of the naval forces operating in the trenches. In the attack on Charleston (1863) he was fleet-captain. He afterwards commanded the steam sloop *Iroquois* and the *Franklin*, and was on special service in Europe until 1872, when he was made chief of the Bureau of Docks and Yards. He was superintendent of the Naval Academy from 1874 to 1878, and held the same office for some time in 1881. During his naval service he rose to the grade of rear-admiral (1874). In 1881 he was retired.

RODGERS, JOHN (1771-1838). An American naval officer, born in Harford County, Md. He entered the naval service in 1798 as a lieutenant, and was executive officer of the frigate *Constellation* under Captain Truxtun at the time the French frigate *L'Insurgente* was captured off Nevis, February 9, 1799. For his conduct in this action he was promoted to a captaincy. In May, 1803, he commanded the *John Adams* in the Mediterranean. In 1804 he commanded the *Congress* at Tripoli, in the squadron under Captain Barron, whom he succeeded in 1805. After peace was declared, he sailed to Tunis, where he dictated terms of peace to the Bey. His action while on the *President*, with the British man-of-war, *Little Belt* (May 17, 1811), as the result of an attempt on his part to effect the rescue of an impressed American seaman, widened the breach then existing between Great Britain and the United States. In 1812, war having been declared by the United States, Commander Rodgers was placed in command of a squadron consisting of the *President*, *United States*, *Congress*, *Hornet*, and *Argus*, and meeting the British ship *Belvidera*, chased her, and a running fight followed—the first battle of the war—in which Rodgers was wounded by the bursting of a gun in his vessel, the *President*. On a cruise soon afterwards, he captured a number of British merchantmen, and also the packet *Swallow*, which carried $200,000 in specie. In 1814 he was ordered to the command of the new frigate *Guerrière*, and rendered valuable aid in the defense of Baltimore. From 1815 to 1824 he was president of the Board of Naval Commissioners, and in 1823 was acting Secretary of the Navy. From 1824 to 1827 he had command of the squadron in the Mediterranean. After his return he again served as Navy Commissioner until 1837.

RODGERS, JOHN (1812-82). An American naval officer, son of John Rodgers (1771-1838), born in Harford County, Md. He entered the navy as a midshipman in 1828, and saw active service in the Seminole War. During the years 1852-55 he commanded Government exploring expeditions in the North Pacific and Arctic oceans. At the outbreak of the Civil War he was ordered to the West, where for a time he superintended the building of ironclads. He then joined the Port Royal expedition and on May 15, 1862, commanded the *Galena* in the bombardment of Fort Darling. A few months later he was promoted to be captain and on June 17, 1863, while commanding the monitor *Weehawken*, he fought and captured the Confederate ironclad *Atlanta*, thus earning the rank of commodore. In 1870 Rodgers was given command of the Asiatic squadron, and, while on the coast of Korea, was fired upon by two forts, which he promptly bombarded and captured. From 1877 until his death he was superintendent of the United States Naval Observatory at Washington, and in 1863 he was chosen one of the fifty active members of the National Academy of Sciences.

RODIN, rô'dăn', AUGUSTE (1840—). A French sculptor, the chief master of the modern Naturalistic School. He was born near the Pantheon in Paris of a poor family. His only general education was at a school in Beauvais, kept by an uncle. When fourteen years old he entered the famous Petite Ecole in Paris, where many of the most eminent French artists have begun their special training. He failed to gain admission to the Ecole des Beaux-Arts, and studied, without much advantage, at the school of Barye in the Jardin des Plantes, supporting himself by assisting plaster and papier-maché workers. At the age of twenty-two he modeled an extraordinary head, called the "Broken Nose," which is still one of the most powerful and characteristic of his works. In 1863 Rodin entered the service of Carrier-Belleuse, art director of the Sèvres manufactory, and remained with him until the beginning of the Franco-German War. During the siege of Paris he served in the National Guard, and after the war he went to Brussels, where he was extensively employed in architectural decoration, his most important works there being two large groups for the Exchange.

Returning to Brussels after a short visit to Italy in 1875, where he was profoundly impressed by the works of Donatello and Michelangelo, he made an extraordinary statue, the "Age of Bronze," which he took with him to Paris in 1877, and exhibited in the Salon of that year. It was received most enthusiastically by the younger sculptors, but condemned by the more conservative on account of its radical qualities. Before the exhibition of 1878 Rodin modeled some superb decorative heads for the Trocadéro Palace. This work and a bust of "Saint John," which Rodin exhibited in 1879, won for him the patronage and warm friendship of Turquet, Under-Secretary of Fine Arts, through whose instrumentality the "Age of Bronze" was bought for the State, and was cast in bronze and placed in the Luxembourg gardens. Some of the vases which Rodin had designed for Carrier-Belleuse were placed in the Sèvres Museum. In 1880 Rodin completed his statue of "Saint John Preaching," perhaps the most powerfully realistic work of modern times, which was bought for the Luxembourg gallery.

In the same year Turquet secured for him a commission for a bronze door for the Musée des Arts Decoratifs. This great work, which was exhibited in 1884 (in 1902 still unfinished), is eighteen feet high and twelve feet wide and is covered with figures suggested by Dante's *Inferno*, whence its name, "La porte de l'enfer." Next in importance among his works is the monument to the six "Bourgeois de Calais," who, in 1347, offered themselves as a sacrifice to appease the wrath of Edward III. of England, a work for which he received the commission in 1883. In its intense naturalism and dramatic energy, this

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work is the culmination of the genius of Rodin, if not of modern sculpture. He also executed a number of admirable busts of great power, among which are those of Legros, Dalou, Victor Hugo, and Rochefort. In recent years he has produced some works of great interest, as "The Kiss" and the monument to Claude Lorrain. Others, however, as the statues of Victor Hugo and Balzac, have shown great eccentricity, if not actual deterioration. There was a comprehensive exhibition of all his works at the Paris Exhibition of 1900.

Consult: Bartlett, "Auguste Rodin, Sculptor," an excellent series of articles in *American Architect*, vol. xxv. (1889); also Maillard, *Auguste Rodin, statuaire* (Paris, 1899); "Rodin et son œuvre," in *La Plume* (ib., 1900); Brownell, *Modern French Art* (New York, 1901).

RODIYAS, rō-dē'yăz. A degraded and outcast race in Ceylon, regarded by some as a branch of the Veddas (q.v.).

ROD'MAN, Thomas Jefferson (1815-71). An American soldier, born at Salem, Ind. He graduated at West Point in 1841, and from that time until his death was continuously employed at various Government arsenals or on ordnance boards, rising to the rank of lieutenant-colonel of ordnance and brevet brigadier-general in the Regular Army. He invented the method of cooling gun-castings from the inside and the prismatic powder for use in large cannon. He published *Reports of Experiments on the Properties of Metal for Cannon and on Cannon Powder* (1861).

RODMAN GUN. See Artillery; Ordnance.

ROD'NEY, Cæsar (1728-84). An American patriot, born at Dover, Del. From 1775 to 1758 he was high sheriff of Kent County, and then became justice of the peace and judge of the lower courts. He was a delegate to the Stamp Act Congress in 1765, was Speaker of the Delaware Assembly from 1769 to 1774, and was chairman of the Delaware Committee of Safety and of the State Convention in 1774. In 1774-76 he was one of Delaware's representatives in the Continental Congress, where he was a strong advocate of independence, and was one of the signers of the Declaration. Having, in 1775, been made a colonel and later a brigadier-general of the State militia, he served under Washington in 1777, becoming a major-general of militia in September. From 1778 to 1782 he was President of Delaware.

RODNEY, George Brydges, first Baron Rodney (1719-92). An English admiral. Entering the English navy in 1732 as King's letter-boy, he became lieutenant in 1739 and post captain in 1742, and won his first honors through his brilliant participation in Hawke's victory of October 14, 1747, over theFrench fleet under L'Etenduère. Having rendered valuable services in the English West Indies in 1761-62, he was in the latter year advanced to the vice-admiralty, and in 1764 made a baronet. In 1779, at the time of the alliance of Spain with France against England, Rodney, now admiral, received command of the fleet at the Leeward Islands station, with instructions also to relieve Gibraltar, besieged by the Spanish. After capturing seven Spanish ships of war bound for Cadiz, he fell in, January 16, 1780, with the Spanish admiral Langara, off Cape St. Vincent. Of the Spanish fleet five vessels were captured and two destroyed. Having accomplished the relief of Gibraltar and Minorca, he quitted the Mediterranean, crossed the Atlantic to the station of his new command, and won an indifferent victory, near Martinique, over the French fleet under the Count de Guichen. The victory upon which his fame mainly rests was that won over the French fleet under De Grasse, off Dominica, April 12, 1782. The battle was more obstinately contested than any other engagement of the war, being kept up without intermission for nearly twelve hours. De Grasse was totally defeated, and made prisoner. Rodney's victory saved Jamaica and ruined the naval power of France and Spain. Meanwhile in England the North Ministry had fallen, and the Rockingham Ministry had sent Admiral Pigot to supersede Rodney for political reasons, before news of his great victory had reached London. As a reward for his services he was raised to the peerage as Baron Rodney, and given a pension of £2000 per annum for himself and his successors. He lived in retirement for the rest of his life and died May 23, 1792. Consult: Mundy, *Life and Correspondence of Admiral Lord Rodney* (London, 1830); Hannay, *Rodney* (ib., 1891).

RODOSTO, rō-dŏs'tō. A town in the Vilayet of Adrianople, European Turkey, situated on the north shore of the Sea of Marmora, 78 miles west of Constantinople (Map: Turkey in Europe, F 4). It is surrounded by beautiful gardens, and has many mosques, several Christian churches, and a Greek school. Population, about 20,000, nearly half of them Greeks.

RODRIGUEZ, rō-drē'gĕs. A small volcanic island in the Indian Ocean, about 370 miles east of the British island of Mauritius (q.v.), of which it is an administrative dependency (Map: World, Eastern Hemisphere, L 27). It covers an area of about 40 square miles, and has a good climate and a rich flora. There is a safe harbor on the northern coast. Population, in 1901, 3163, chiefly settlers from Mauritius.

ROD'WELL, John Medows (1808-1900). An English Orientalist, born at Barham Hall, Suffolk, and educated at Bury Saint Edmunds and at Gonville and Caius College, Cambridge. He took holy orders and for fifty-seven years was rector of Saint Ethelburga's, Bishopsgate. Rodwell was an accomplished Hebrew and Arabic scholar and translated the Koran (1861; 2d ed. 1876—the best English version), the Book of Job (1864; 2d ed. 1868), and Isaiah (1881; 2d ed. 1886), as well as liturgies from the Coptic (1866) and from Ethiopic manuscripts (1864).

ROE, Edward Payson (1838-88). An American clergyman and novelist, born in Moodna, Orange County, N. Y. Illness caused him to leave Williams College before graduation, but he afterwards received a bachelor's degree, studied at Auburn and Union Seminaries, and in 1862-65 was a chaplain in the volunteer service. He was from then until 1874 pastor of the Presbyterian Church at Highland Falls, N. Y., after which he gave himself up to lecturing, writing, and fruit culture. His first novel, *Barriers Burned Away* (1872), a story suggested by the Chicago fire, was followed by *Play and Profit in My Garden* (1872) and many novels, all

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very popular in the United States, many of them reprinted in England, and some translated into German. Of these the chief are *What Can She Do?* (1873), *Opening of a Chestnut Burr* (1874), *From Jest to Earnest* (1875), *Near to Nature's Heart* (1876), *A Knight of the Nineteenth Century* (1877), *A Face Illumined* (1878), *A Day of Fate* (1880), *His Somber Rivals* (1883), *A Young Girl's Wooing* (1884), *An Original Belle* (1885), *Driven Back to Eden* (1885), *He Fell in Love with His Wife* (1886), *The Earth Trembled* (1887). He wrote also *Success with Small Fruits* (1880) and *Nature's Serial Story* (1884). Consult *E. P. Roe, Reminiscences of His Life*, by his sister, Mary A. Roe (New York, 1899).

ROE, Francis Asbury (1823-1901). An American naval officer, born in New York City. He graduated at the Naval Academy in 1848, in 1849 was dismissed from the service for disobedience, but was reinstated in 1850, and saw his first active service in 1854 against Chinese pirates. As executive officer he was on the *Pensacola* in its run down the Potomac in 1861, and he was with Farragut in 1862 and 1863. In 1864, commanding the *Sassacus*, Roe fought a sharp duel with the *Albemarle* and forced its retreat. Toward the close of the war he was on duty in the Great Lakes. He was sent on a special mission to Mexico in 1867, received the surrender of Vera Cruz, and showed himself an able diplomat. He was promoted to the rank of rear-admiral in 1884, and retired in 1885.

ROE, Richard. See Doe, John.

ROE, Sir Thomas (c.1568-1644). An English diplomat, born at Low Leyton, Essex, and educated at Magdalen College, Oxford. He studied in France besides, and lived at Court in Elizabeth's last years. In 1610, five years after he was knighted, Prince Henry fitted him out for a voyage of discovery. Roe sailed up the Amazon and along the coast to the Orinoco, and made two more voyages in the 'Indies,' searching for gold. The East India Company sent him as ambassador to the Mogul in 1615. His successful negotiations are described in his *Journal*, published in 1625. In 1621 he was sent to Constantinople, and then described the Ottoman Empire as 'irrecoverably sick.' His mission was successful, as was one undertaken in 1629 to mediate between Sweden and Poland, and another in 1638-41 at the Diet of Ratisbon. The Alexandrian manuscript of the Greek Bible, now in the British Museum, and an Oriental collection presented to the Bodleian Library, were brought to England by him.

ROEBER, rē'bĕr, Friedrich (1819-1901). A German author, born in Elberfeld. He was a member of the Wupperthal group of poets in his youth. His *Lyrische und epische Gedichte* (1878) met with great success, but he is better known as a dramatist, the author of *Tristan und Isolde* (1854; revised 1885), *Sophonisbe* (1884), *Börsenringe* (1891), and *Antike Lustspiele* (1892). His further works include *Marionetten*, a romance (2d ed. 1885), and *Litteratur und Kunst im Wupperthal* (1886).

ROEBLING, rē'bling, John Augustus (1806-69). An American engineer. He was born at Mühlhausen, Prussia, and studied civil engineering at the Polytechnic School of Berlin. In 1831 he came to America and settled near Pittsburg, Pa. He was made assistant engineer on the slack-water navigation of the Beaver River. After similar engagements in other places, he was appointed to survey the route across the Alleghanies adopted by the Pennsylvania Railroad. He then began the manufacture of wire rope, and in 1844-45 replaced the wooden aqueduct of the Pennsylvania Canal across the Allegheny River by a suspension aqueduct. Afterwards he constructed the Monongahela suspension bridge at Pittsburg, and from 1848-50 four suspension aqueducts on the Delaware and Hudson Canal. He established his works at Trenton, N. J., and in 1851 began the great suspension bridge over the Niagara River. In 1867 he began the Cincinnati suspension bridge, which has a clear span of 1057 feet. His last enterprise was the bridge across the East River, connecting Brooklyn and New York. The designs were completed and work had begun on the bridge when Mr. Roebling died from the result of an injury he had received while directing the construction. He published *Long and Short Span Bridges* (1869). See Bridge.

ROEBLING, Washington Augustus (1837—). An American civil engineer, son of John A. Roebling. He was born at Saxonburg, near Pittsburg, Pa., graduated at Rensselaer Polytechnic Institute, Troy, in 1857, worked under his father on the Allegheny suspension bridge, and at the beginning of the Civil War entered the Federal army as a private in the Sixth New York Artillery. Save for the first year of his enlistment, he was on staff duty. After the evacuation of Yorktown he built a 1200-foot suspension bridge across the Rappahannock. In the second Bull Run campaign he built a bridge at Harper's Ferry across the Shenandoah River. While reconnoitring from a balloon, he is said to have first discovered Lee's movement from Fredericksburg toward Pennsylvania. On retiring from the army he undertook the completion of the Cincinnati and Covington bridge. Having spent some time in Europe studying pneumatic foundations, in 1869 he succeeded to the complete charge of the construction of the great New York and Brooklyn bridge. He considerably changed his father's plans, especially by increasing the size of the anchor plates. His devotion to the work and especially his almost continuous stay in the compressed-air caissons proved too much for an already weakened constitution, and from 1873 to the completion of the bridge in 1883 he had to direct the work from his sick-room. After 1883 he settled in Trenton, as head of the wire business established by his father.

ROEBUCK, John Arthur (1802-79). A British politician. He was born at Madras, India, and passed his youth in Canada, where he was educated. In 1824 he went to England, studied law, and was called to the bar at the Inner Temple in 1831. Twice member of Parliament for Bath, in 1849 he was returned for Sheffield, which he represented till 1868, and again from 1874 until his death. In 1835, when the executive Government of Canada and the House of Assembly of Lower Canada were at variance, the latter body appointed Roebuck their paid agent in England—a position which involved him in a serious quarrel with the press. He warmly supported the Earl of Beaconsfield's

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policy during the Eastern crisis in 1877-78, and in 1878 was made a member of the Privy Council. He was an active pamphleteer and the author of a work on the *Colonies of England* (1849), and of the *History of the Whig Ministry of 1830* (2 vols., 1832).

ROE DEER (AS. *rāhdēor*, from *rāh*, OHG. *rēh*, Ger. *Reh*, Eng. *roe* + AS. *deor*, Eng. *deer;* connected with Skt. *rekha, lēkha*, line, *rikh, likh*, to write, scratch). A European deer (*Capreolus caprea*), once plentiful throughout wooded regions as far east as Persia, and still to be found wild in thinly settled countries. The buck stands about 26 inches high, weighs about 60 pounds, and is tawny brown in summer, more dull and grizzled in winter, the lower parts and around the tail white; the tail is very short. The antlers of the buck are 8 or 9 inches long, erect, round, very rough, and have two sharp tines (but no brow tine). The roe is not gregarious, and pairs are said to remain attached during life. The voice resembles that of sheep, but is shorter and more barking. Another species of roe (*Capreolus pygargus*), rather larger than the common roe, is found in Tatary, and a third in Manchuria. Consult: Lydekker, *Deer of All Lands* (London, 1898); Aflalo, *Sport in Europe* (ib., 1901).

ROE DEER.

ROEDERER, rē'de-rār', PIERRE LOUIS, Count (1754-1835). A French administrator and historian, born at Metz. He was elected to the Third Estate in 1789, and soon became well known as an administrative reformer. He became professor of economics in 1796, enjoyed Napoleon's favor, and in 1806 was appointed Minister of Finance in the Kingdom of Naples. Further advance was hindered by his opposition to the Continental blockade. Roederer sided with Napoleon in the Hundred Days and took no prominent part in politics after the Second Restoration, although he sat in the House of Peers in 1815 and after the Revolution of July, 1830. He wrote: *Mémoires pour servir à l'histoire de Louis XII. et François I.* (1825) and *Esprit de la révolution de 1789* (1831). His complete works were edited by his son (Paris, 1853-59).

ROEDIGER, rē'dĭ-gĕr, EMIL (1801-74). A German Orientalist. He was born at Sangerhausen, studied philology and theology at Halle, 1821-26 and became there privat-docent in 1828. He was appointed successively professor extraordinary (1830) and full professor (1835) of Oriental languages, and in 1860 accepted a similar position at Berlin, where he spent the rest of his life. Besides numerous papers on paleography and various Oriental topics published mainly in the *Zeitschrift für die Kunde des Morgenlandes* and the *Zeitschrift der deutschen morgenländischen Gesellschaft*, of which his *Litteraturberichte* in volumes v., viii., ix. and x. of the latter deserve special mention, his main works were: *De Origine et Indole Arabicæ Librorum Veteris Testamenti Historicorum Interpretationis Libri Duo* (1829); an edition of Lokman's Fables (*Locmani Fabulæ*, 1830; 2d ed. 1839); *Chrestomathia Syriaca* (1838; 3d ed. by his son, 1892); *Versuch über die himjaritischen Schriftmonumente* (1841); *Wellsteds Reisen in Arabien, Deutsche Bearbeitung* (1842). He finished Gesenius's *Thesaurus Linguæ Hebraicæ*, which its author's death had left incomplete, and edited editions (14-21) of Gesenius's grammar (1845-72). He also assisted in the preparation of Payne Smith's *Thesaurus Syriacus*.

ROELAS, rō-ā'lās, JUAN DE LAS (called EL LICENCIADO, also EL CLÉRIGO ROELAS) (1560-1625). A Spanish religious painter, born at Seville, of a noble family. He studied painting probably in Venice, where he was much influenced by the works of Titian and of Tintoretto, of whose style his own is suggestive. Although he was one of the chief masters of Andalusia, his works were little known out of Spain until the nineteenth century, the finest of them being at Seville, notably his masterpiece, "The Transit of Saint Isidore," in the Church of San Isidoro; "Saint James in the Battle of Clavigo" (1609), in the Cathedral; and "The Martyrdom of St. Andrew," in the Museum. The Madrid Museum contains his "Moses Striking the Rock," the Berlin Museum a "Madonna Worshiped by a Jesuit," and the Hermitage, Saint Petersburg, the "Communion of Saint Theresa."

ROELOFS, rōō'lōs, WILLEM (1822-97). A Dutch painter, etcher, and naturalist, born at Amsterdam. Having begun his studies at Utrecht, he continued them at The Hague under Hendrik van de Sande-Bakhuyzen (1795-1860). In France he was much influenced by the painters of the "paysage intime," and he also roamed all over Holland, choosing the subjects for his paintings, in both oil and water colors, most frequently from the less known regions of his country. The Amsterdam Museum contains a "View near Abconde" and "View near The Hague"; the Rotterdam Museum a "Landscape with Cattle"; and the Liège Museum a "Forest in Autumn." Roelofs was also favorably known for his researches in entomology.

ROEMER, rē'mĕr, FRIEDRICH ADOLF (1809-69). A German geologist, born in Hildesheim and educated at Göttingen and Berlin. In 1845 he became instructor in mineralogy and geology at the Klausthal School of Mines, of which he was superintendent from 1862 to 1867. He was a pioneer in pointing the relation between Jurassic and Cretaceous formations in Germany with those in the rest of Europe and an authority on the mountains of Northern Germany. His works include: *Die Versteinerungen des norddeutschen Oolithengebirges* (1835-39); *Versteinerungen des norddeutschen Kreidegebirges* (1840-49); and *Beiträge zur geologischen Kenntnis des nordwestlichen Harzgebirges* (1850-66).

ROEMER, OLAUS, or OLE (1644-1710). A Danish astronomer, born at Aarhus, Jutland. He was educated at the Copenhagen University, and afterwards accompanied Picard to France, and was appointed tutor to the Dauphin by Louis XIV. He became eminent in astronomy and mathematics and was made a member of the Academy of Sciences in 1672. He was an asso-

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ciate of Picard and Cassini in many investigations and discoveries. Roemer was the first to notice that light does not move through space instantaneously, but requires an appreciable interval of time for its transmission. (See ABERRATION OF LIGHT.) This far-reaching discovery is his principal claim to fame. (See SATELLITES.) In 1681 he returned to Denmark as professor of astronomy at Copenhagen, held several public positions, and finally became Chancellor of the Exchequer.

ROENTGEN, rēnt'gen, WILHELM KONRAD (1845—). A German physicist, born at Lennep, in Rhenish Prussia. He received his doctor's degree in 1869 at the University of Zurich, where he studied under Kundt. He was afterwards professor at Hohenheim, Strassburg, and Giessen, and in 1885 he became professor at the University of Würzburg. In 1899 he was appointed professor of experimental physics at the University of Munich, a position which he now holds. In November, 1895, he read before the Physico-Medical Society of Würzburg a paper upon his discovery of the rays which bear his name. For this discovery he received many honors, including the Rumford Medal of the Royal Society of London and the Barnard Medal of Columbia University, awarded in 1900 for the greatest discovery in science during the preceding five years. (See X-RAYS.) He published, chiefly in the *Annalen der Physik und Chemie*, many articles on various physical subjects, including the properties of crystals, specific heat of gases, absorption of heat ray in vapors and gases, electrostriction, piezo electricity, various other electric and magnetic phenomena, and telephony.

ROERMOND, rōōr'mônt. A town in the Province of Limburg, in the Netherlands, situated at the confluence of the Roer with the Meuse, 28 miles northeast of Maastricht (Map: Netherlands, E 3). It contains a thirteenth-century Romanesque cathedral, a seminary, and a fine palace of justice. The manufactures of the town consist of woolens, cotton goods, paper, stone and wood carvings. Population, in 1900, 12,348.

ROESKILDE, rōs'kīl-de, or **ROSKILDE**. A town on the island of Zealand, Denmark, situated at the head of the Roeskilde Fjord, 16 miles west of Copenhagen, at the converging point of the three principal railroad lines of Zealand (Map: Denmark, F 3). It contains a magnificent cathedral, erected 1074-84, rebuilt in the twelfth century, and containing the tombs of Danish kings. Population, in 1901, 8368. Roeskilde is one of the oldest towns of Denmark. Previous to 1443 it was the capital of the kingdom and the residence of the royal family, but its decline was consequent on the rapid growth of Copenhagen, and fire and the ravages of the plague destroyed its prosperity. A treaty was concluded here in 1658 between Denmark and Sweden, in which the former relinquished her possessions beyond the Sound.

ROGATION DAYS (Lat. *rogatio*, supplication, from *rogare*, to ask). The Monday, Tuesday, and Wednesday before Ascension Day, so called because on these days the litanies (q.v.) are appointed to be sung or recited by the clergy and people in public procession. The practice of public supplications on occasions of public danger or calamity is traceable very early in Christian use; but the fixing of the days before Ascension for the purpose is ascribed to Mamertus, Bishop of Vienne, in the middle of the fifth century, who, on occasion of a threatened earthquake or other public peril in his city, ordered a public procession and prayer, for the purpose of averting the divine anger. The usage in the Roman Catholic Church became general and permanent. The form of prayer employed is that known as the *Litany of the Saints*. In England, after the Reformation, the recitation of the litanies upon these days was discontinued, but the days remain as days of abstinence and prayer to obtain God's blessing upon the fruits of the earth; they form also a brief preparation, somewhat analogous to Advent and Lent, before the great festival of the Ascension.

ROGER (rŏj'ĕr) **I.** (Roger Guiscard) (c.1031-1101). Grand Count of Sicily, founder of Norman rule in that island. He was the youngest of the sons of the Norman noble Tancred de Hauteville (q.v.). In 1158, in answer to the summons of his brother, Robert Guiscard (q.v.) he went to Italy. On his arrival he was deputed by Robert to conquer Calabria, an achievement which was speedily executed. In 1060 he set out on an expedition against Sicily, then ruled by a number of Saracen chiefs, and by 1090 he had taken the most important towns, and ousted the Saracens from the control of the island. In 1062 he was invested by his brother with Sicily and part of Calabria under the title of Count. Roger divided the country into fiefs, which he distributed among his chief barons, whose relations to their subjects were regulated by him with justice and moderation. Moreover, he extended his own rule in Calabria. About 1096 he took the title of 'grand count,' to distinguish him from his vassals. Roger was courted by the most powerful princes of Europe. He fostered learning and was very tolerant in religious matters, protecting the Saracens within his dominions. He supported Rome against the Greek Church, and in 1098 Pope Urban II., in recompense for his fidelity to the Holy See, conferred the title of Papal legate upon him and his heirs forever. He died at Mileto, in Calabria, in July, 1101. Consult Schack, *Geschichte der Normannen in Sicilien* (Stuttgart, 1889).

ROGER II. (c.1097-1154). Grand Count of Sicily from 1101 to 1130 and King of Sicily from 1130 to 1154. He was a son of Roger I. (q.v.). Upon the death of his brother Simon, he became the heir to Sicily, and during his minority the government was administered by his mother, a princess of Montferrat. When Roger had taken the supreme authority into his own hands, his first care was to extend his dominions. He compelled his cousin William to yield up the portion of Calabria and of the town of Palermo which Robert Guiscard had withheld from his father; and after the death of William (1127) he took possession of Apulia itself. Ambitious of the title of king, he supported the anti-pope Anacletus, his wife's uncle, and received from him the title of King of Sicily, with rights of suzerainty over the duchies of Naples and Capua. In return, Roger established Anacletus on the pontifical throne in 1130. His bitter enemy, Inocent II., fell into his hands in 1139, and was compelled to withdraw the excommunications he had pronounced against Roger, and to consent to his retaining the territories he had acquired, obtaining by these means not only his own lib-

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erty, and his recognition as lawful Pope, but also the firm attachment of Roger to the Holy See. In 1144 Roger received from Pope Lucius II. the right of using the various symbols of ecclesiastical dignity and power. In 1147 he began war on the Byzantine Emperor, Manuel Comnenus, who had been in the league with the Pope and the Emperor against him. Corfu was captured and Cephalonia, Negropont, Corinth, and Athens were pillaged. He followed up these successes by the capture of Tripoli and other places on the African coast, and afterwards attacked the Zeirides, leaving at his death an African dependency which stretched from Morocco to Kairwan. He died at Palermo, February 26, 1154. His daughter Constantia married in 1186 the Emperor Henry VI., whereby the Hohenstaufen succeeded in 1194 to the rule of the Two Sicilies. Consult Schack, *Geschichte der Normannen in Sicilien* (Stuttgart, 1889).

ROGER OF WEN'DOVER (?-1237). An English chronicler, monk of Saint Albans and for a time prior to Belvoir. He transcribed the *Flores Historiarum*, a work supposed to have been compiled by John de Cella, and added to it an original chronicle from 1189 to 1235. The whole was revised and extended to 1259 by Matthew Paris. The work was edited by Coxe for the English Historical Society (1841-42), and by Hewlett in the Rolls Series (1886-89).

ROGERS, rŏj'ērz, FAIRMAN (1833-1900). An American civil engineer, born in Philadelphia. He graduated at the University of Pennsylvania in 1853, and from 1855 to 1871 was professor of civil engineering in the University of Pennsylvania, of which he was long a trustee. Rogers served in the Civil War, in the Philadelphia City Cavalry, and as engineer on the staffs of General Reynolds and Gen. W. F. Smith. He was one of the charter members of the National Academy of Sciences. He wrote *Terrestrial Magnetism and the Magnetism of Iron Ships* (1877; revised, 1883).

ROGERS, HENRY DARWIN (1806-66). An American scientist, born in Philadelphia. He studied at William and Mary College, and in 1830-31 was professor of chemistry and natural philosophy at Dickinson College, and then studied for two years in Europe. After his return he lectured at Franklin Institute in Philadelphia, and in 1835 became professor of geology at the University of Pennsylvania. The same year he made for the Government of New Jersey a geological and mineralogical survey of that State, publishing a full report in 1840. From 1836 to 1842, and again from 1851 to 1854, he was State geologist of Pennsylvania. In 1855 he removed to Edinburgh, Scotland, where the final report of his geological works was published under the title *The Geology of Pennsylvania, a Government Survey* (2 vols., 1858). From 1857 until his death he was regius professor of natural history in the University of Glasgow. Consult *Popular Science Monthly*, vol. l. (New York, 1897).

ROGERS, HENRY WADE (1853—). An American jurist, born in Holland Patent, N. Y. He graduated at the University of Michigan in 1874, and was appointed professor of law in its law school in 1883. After five years as dean of the same school he was elected president of Northwestern University (1890) and in 1901 became a member of the Yale faculty of law. Rogers was chairman of the World's Congress of Jurisprudence and Law Reform at Chicago in 1893. He published *Illinois Citations* (1881) and *Expert Testimony* (1883).

ROGERS, JAMES EDWIN THOROLD (1823-90). An English political economist, born at West Meon, Hampshire. He was educated at King's College, London, and at Magdalen Hall, Oxford, where he graduated in 1846. He was ordained soon after his graduation, and took part in the High Church movement. In 1859 he was elected Tooke professor of statistics and economic science at King's College, and in 1862 was chosen Drummond professor of political economy at Oxford, but failed of reëlection to that position in 1868. He then entered politics, and represented Southwark in Parliament from 1880 to 1885. In 1888 he was reëlected professor at Oxford. Rogers was one of the pioneers in the study of English economic history. His researches were profound, and have furnished a vast amount of material for later writers, although his conclusions suffer from a tendency toward extreme partisanship. In his theoretical work he was a close follower of the *laissez-faire* school of classical economists, although he rejected some of the more important principles of that school, such as the Ricardian theory of rent. His principal works are: *Six Centuries of Work and Wages* (1885); *History of Agriculture and Prices in England* (1866, 1887); *First Nine Years of the Bank of England* (1887); *The Economic Interpretation of History* (1888); and *The Industrial and Commercial History of England* (published posthumously, 1892).

ROGERS, JOHN (c.1500-55). An English martyr, born at Deritend, near Birmingham, and educated at Cambridge. After being ordained he was a London rector, 1532-34, and chaplain to the English merchants at Antwerp, 1534-36, where he met William Tyndale, and renounced the Roman Catholic faith. In 1537 he became pastor of a Protestant church at Wittenberg. On the accession of Edward VI. he returned to England by invitation of Bishop Ridley, and became rector of Saint Margaret Moyses and Saint Sepulchre, in London, in 1550; in 1551 he was made prebendary of Saint Pancras, Saint Paul's, and rector of Chigwell, and in 1553 divinity reader. On the Sunday after the entrance of Queen Mary into London in 1553 he preached at Saint Paul's Cross, denounced Popery, and urged upon the people a steadfast adherence to the doctrines taught in King Edward's time. Summoned before the Privy Council, he ably defended himself, and was released; but on August 16th he was ordered to remain a prisoner in his own house, and deprived of all his emoluments. On January 27, 1554, he was removed to Newgate and treated with great severity. In January, 1555, he was tried before Gardiner, Bishop of Winchester, and on January 29 was condemned to be burned at Smithfield, London, which sentence was carried out on Monday, February 4th. He compiled the first authorized English Bible, prepared from Tyndale's manuscript and Coverdale's translation, which was published under the name of Thomas Matthew. It was printed at Antwerp by Jacob van Meteren. Copies of it in sheets were imported by Richard Grafton and sold in London 1537 (latest edition 1551). In Fox's *Martyr-*

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ology are found an account of his examinations written while in prison, and other papers. Consult the *Life* by Chester (London, 1861).

ROGERS, JOHN (c.1572-1636). A Puritan divine. He was educated at Cambridge University, became vicar of Honingham, Norfolk, in 1592; vicar of Haverhill, Suffolk, in 1603, and from 1605 until his death was vicar of Dedham, Essex. He was a forcible preacher and his publications, which were valued highly by English Puritans, include *Sixty Memorials of a Godly Life* (n.d.); *The Doctrine of Faith* (1627); *Treatise of Love* (1629); *A Godly and Fruitful Exposition Upon All the First Epistle of Peter* (1650). His second son, NATHANIEL (1598-1655), was educated at Cambridge, where he graduated M.A.; became curate at Bocking, Essex, and rector of Assington, Suffolk, for five years, and in 1636 emigrated to New England, where he settled at Ipswich, Mass. He published a *Letter Discovering the Cause of God's Wrath Against the Nation* (1644).

ROGERS, JOHN (1829-1904). An American sculptor, born in Salem, Mass. He received his artistic training at Rome and Paris (1857-59). Upon his return to the United States he exhibited the "Slave Auction" (1860), which first brought him into prominence, and in 1860-65 he executed a series of war statuette groups in gray clay, among which were the "Picket Guard," "One More Shot," and "Union Refugees." His statuettes in green clay representing genre subjects, though very popular, cannot be classed as serious works of art. Among his works of this class are "Coming to the Parson" (1870), the "Charity Patient," and "Going for the Cows" (1873). Other statuette groups illustrate passages from Shakespeare, Irving's *Rip Van Winkle*, and Longfellow's *Miles Standish* ("John Alden and Priscilla"). His more ambitious efforts include the equestrian statue in bronze of General Reynolds (1881-83) in front of the City Hall, Philadelphia, and a bronze group of "Ichabod Crane and the Headless Horseman" (1887).

ROGERS, RANDOLPH (1825-92). An American sculptor, born at Waterloo, New York. When twenty-one years old he went to Rome, and studied with the sculptor Lorenzo Bartolini until 1850, when he returned to New York. In 1855 he went back to Italy and remained there the rest of his life. During his visit to New York he exhibited some statues which attracted attention, among them "Nydia, the Blind Girl of Pompeii," and a "Boy with a Dog." Among his notable works may be mentioned a statue of "John Adams" in the cemetery at Mount Auburn, near Boston: the bronze doors of the new Capitol extension in Washington, the bas-reliefs of which represent the principal events of the career of Columbus; the "Angel of the Resurrection" for the tomb of Col. Colt, at Hartford, Conn. (1861); and figures of Marshall, Mason, and Nelson for the Washington monument at Richmond, Va., which was left unfinished by Crawford at his death. Rogers was extensively employed on a series of colossal memorial monuments for various American cities, as at Providence, R. I. (1871); Detroit, Mich. (1873); and Worcester, Mass. (1874). His other works include a colossal bronze statue of Lincoln for Philadelphia (1871); the "Genius of Connecticut" for the State Capitol in Hartford; and a statue of W. H. Seward in New York (1876). Rogers presented a complete collection of casts of his works to the University of Michigan.

ROGERS, ROBERT (1727-84?). An American soldier, one of the best known figures in the history of American border warfare. He was born, of Scotch-Irish parentage, at Londonderry, N. H. In 1755, at the outbreak of the French and Indian War, he was commissioned captain of a company of rangers, which, under the name 'Rogers's Rangers,' soon became widely known. During the year 1756, with Fort William Henry as his base of operations, Rogers made thirteen daring raids into the country about Ticonderoga. In a scouting expedition to the north of Ticonderoga in January, 1757, his band was almost annihilated by a greatly superior force of Indians and Canadians. Later Rogers accompanied Lord Loudon on his abortive Louisburg expedition, and in March, 1758, he defeated a much larger force of the enemy near Ticonderoga. In August he repulsed an attack of the French under Marin near old Fort Anne. He took part in Wolfe's Quebec expedition, and later destroyed the village of the Abenakis, or Saint Francis Indians, who had long been the scourge of the New England frontier, though his own force was almost annihilated before he got back to the English outposts. In 1760 he was with Amherst at the capture of Montreal, and late in the year was sent to Detroit, which capitulated to him. For some time thereafter he lived quietly in New Hampshire, but in 1765 was in England, where he published his *Journal*, and also his more popular *Account of North America*. In 1766 he was made commander of the post of Michilimackinac, but two years later was sent in irons to Montreal on a charge of conspiring to turn the fort over to the French. He was acquitted by court-martial, however, and in 1772-73 was in the Algerine service. At the outbreak of the Revolutionary War he was suspected by the Patriots of being a Tory, was arrested in Philadelphia in 1775, and was turned over on parole to the New Hampshire authorities by order of Congress, but escaped to New York, where he was given a colonel's commission by Lord Howe, and recruited the Loyalist regiment known as the 'Queen's Rangers.' He resigned, however, and went to England in the winter of 1776-77, but returned to America toward the end of the war, and for a time commanded a second Loyalist regiment, which he recruited in Canada. Although he is generally said to have died in London in 1800, according to a family tradition his death took place in 1784. His *Journal* (1765) contains valuable details of the French and Indian War. *A Concise Account of North America* (1765), intended to be a popular account of frontier life, particularly of the Indians, is a curious compound of fact and fiction. Rogers is also credited with the authorship of a tragedy entitled *Ponteach; or the Savages of North America* (1776).

ROGERS, ROBERT WILLIAM (1864—). An American Orientalist, born in Philadelphia. He studied at the University of Pennsylvania, at Johns Hopkins, where he graduated in 1887, and at Leipzig and Berlin. After three years as professor of English Bible and Semitic history at Dickinson College, he was appointed to a chair of Hebrew and exegesis in Drew Theological

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Seminary. His chief publications are: *Two Texts of Esarhaddon* (1889); *Inscriptions of Sennacherib* (1893); *Outlines of the History of Early Babylonia* (1895); and *History of Babylonia and Assyria* (1900).

ROGERS, SAMUEL (1763-1855). An English poet, born at Stoke Newington, near London. His taste for literature and the company of literary men awoke at an early period, when he familiarized himself with Johnson, Goldsmith, and Gray. In 1786 he published his first book, entitled *An Ode to Superstition, and Some Other Poems*, followed in 1792 by *Pleasures of Memory*—the work on which his fame most securely rests. In 1803 he retired from active business on an income of £5000 a year, and built and adorned a house in Saint James's Place overlooking the Green Park, where he entertained many of the literary men of the time. His breakfasts became famous. After settling here, he published *Columbus* (1810; privately, 1808), a theme too large for him. In 1814 *Jacqueline* appeared in the same volume with Byron's *Lara*. In 1819 he issued *Human Life*, one of his best poems; and, in 1822, *Italy*. To this last poem a second part was added (1828). After this date Rogers wrote little, his time being mainly devoted to dining, epigram, and anecdote. In 1850 the laureateship was offered to him, but declined. He died December 18, 1855. No name occurs oftener than his in the literary annals of the time. Possessed of a large fortune, he befriended his poorer brethren; he obtained a pension for Cary and a position for Wordsworth, and healed the quarrel between Moore and Byron. The high place given him as a poet by his contemporaries he has not been able to maintain. Consult: Dyce, *Recollections of the Table-Talk of Rogers* (London, 1860); Clayden, *The Early Life of Rogers* (Boston, 1888); id., *Rogers and His Contemporaries* (London, 1889).

ROGERS, WILLIAM AUGUSTUS (1832-98). An American astronomer and physicist, born in Waterford, Conn. He graduated at Brown University in 1857, immediately became instructor, and in 1859 professor of mathematics at Alfred University, where, from 1866 to 1870, he was head of the department of industrial mechanics, and then became assistant in the Harvard Observatory. There he mapped a part of the skies north of the zenith and contributed to the *Annals* of the observatory. In 1886 he became professor of physics and chemistry at Colby University. Rogers's most important work was in metrology, and included the construction of a dividing engine of high precision, and standards of length, which were compared with the British and International prototypes, as well as with the United States standards.

ROGERS, WILLIAM BAETON (1804-82). An American scientist and educator, first president of the Massachusetts Institute of Technology. He was born in Philadelphia, a son of Patrick Kerr Rogers (1776-1828), then tutor in the University of Pennsylvania, and from 1819 to his death professor in William and Mary College, where his son graduated in 1822 and in 1828 succeeded him in the chair of natural philosophy and mathematics. During the seven years that he held this post he began with his brother Henry a minute study of the geology of Virginia. From 1835 to 1853 as professor of natural philosophy in the University of Virginia he extended this work and became head of the State Geological Survey; the *Papers on the Geology of Virginia* (1884) give the results of this period, in which he was assisted by his three brothers, Robert Empie Rogers having become professor of chemistry and materia medica at the university, in 1842, and Henry Rogers being State geologist of Pennsylvania. As a geologist his work was remarkable for its conscientious foundation on observed facts. Rogers removed to Boston in 1853; as inspector of gas and gas meters reformed the system of inspection (1861); and in 1859 began to urge the establishment of a technical school. For this institution he drew up a scheme in 1860, repeating the outline he had made in 1846, and in 1862 received a charter. In 1865, after a year in Europe to study apparatus, he saw the actual establishment of the Massachusetts Institute of Technology (q.v.) and was appointed its president and professor of physics and geology. He introduced laboratory instruction in physics, chemistry, mechanics, and mining. In 1878, after a forced retirement of several years, he returned to his work, and in the following year succeeded Joseph Henry in the presidency of the National Academy of Sciences. From the presidency of the Institute of Technology he resigned in 1881; in the next year he fell dead on the platform while making an address to the graduating class. Rogers wrote *Strength of Materials* (1838), and *Elements of Mechanical Philosophy* (1852), as well as many papers for scientific associations. Consult his *Life and Letters*, edited by his wife and William T. Sidgwick (Boston, 1897).

ROGET, rô'zhâ', PETER MARK (1779-1869). An English physician and scholar, born in London. He studied medicine at the University of Edinburgh, and removed to Manchester, where he became physician to the lunatic asylum, the fever hospital, and the infirmary. He settled in London in 1808 and was long the secretary of the Royal Society. Among his works are *Animal and Vegetable Physiology* (1834), and a *Thesaurus of English Words and Phrases* (1852), which passed through twenty-eight editions in the author's lifetime, and, as edited by his son in 1879, is still in use.

ROGIER, rô'zhyâ', CHARLES (1800-85). A Belgian statesman, born at Saint-Quentin, France. He studied law at Liège and was admitted to the bar, devoting himself, however, with greater zeal to journalistic campaigns against the Dutch rule in Belgium. Upon the outbreak of the insurrection at Brussels in August, 1830, Rogier raised a band of 300 men and entered the capital, where he gained note as one of the most active among the patriot leaders. He became a member of the provisional Government established in October, and after the election of Leopold of Saxe-Coburg as King, in June, 1831, was made Governor of Antwerp. He left this post in October, 1832, to assume the portfolio of the Interior in the Goblet-Devaux Cabinet, and signalized his term of office by bringing into existence the Belgian railway system. He left the Cabinet in 1834 for his old position of Governor of Antwerp, but reëntered the Ministry in 1840 as head of the Department of Public Works and Education. The Ministry fell in 1841 and Rogier was the leader of the Liberal Opposition in the Chamber of Deputies till 1847, when he was called upon to form a Ministry, in which he held

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the portfolio of the Interior. French influence forced his retirement in October, 1852, but he returned to power in November, 1857, and remained in office for eleven years, acting as Minister of the Interior till 1861, and after that as Minister for Foreign Affairs. As Foreign Minister he conferred an inestimable advantage on his country by obtaining the consent of the great powers to the opening of the Scheldt to navigation. Consult Descailles, *Charles Rogier, 1800-85* (Brussels, 1896).

ROHAN, rō'ăn'. A celebrated French family (named from the little town of Rohan, in Brittany), dating from the twelfth century, and tracing its descent to the royal and ducal line of Brittany. Its two most noted members are given below.

ROHAN, Henri, Duke de (1579-1638). A French Huguenot general, son of Duke René II. and of Catherine de Parthenay, noted as the heroine of La Rochelle, heiress of the House of Soubise (q.v.). He was born at the Château de Blain in Brittany. About 1595 he was sent to the Court of Henry IV., and in 1597 distinguished himself at Amiens in the King's presence. Then he spent more than two years in travel through Germany, Italy, Holland, England, and Scotland. In 1603, soon after his return to France, he was made duke; two years afterwards he married the daughter of the King's great minister Sully; but he did not come into prominence until the death of Henry IV., when the leadership of the Protestant party fell to him. At Saumur in 1611 he effected a union of all the Huguenot factions; and in the same year he decided openly for Condé against Maria de' Medici, with whom he came to an understanding in 1616. But his efforts for union were unavailing, and, upon the rising of the Gascons and Béarnois against the reëstablishment of the Catholic Church among them, he took the field openly, raised the siege of Montauban and forced the signature of the Peace of Montpellier and the confirmation of the Edict of Nantes (1622). He was made Marshal of France by Louis XIII., but Richelieu's policy was heedless of the treaty, and the Protestants rose again in 1625 under the lead of Rohan and his brother, the Prince de Soubise. Peace was made in 1626, but the struggle was soon renewed, ending in the triumph of the royal cause (1629). Rohan was named generalissimo of the Venetian troops in 1631; then returned to France and after a brilliant campaign drove the Austrians and Spanish from the Valtelline (1635); and, after a brief retirement in Geneva, joined Bernhard of Weimar in 1638. In that year he was mortally wounded at Rheinfelden. Rohan wrote *Mémoires* (1644), describing his three campaigns in France; an account of his travels in 1598-1600 (printed 1646); *Les intérêts des princes* (1666); *Traité du gouvernement des treize cantons* (1644); *Discours politiques* (1693); and a fourth book of *Mémoires* on the war in the Valtelline (1785). Consult Laugel, *Henri de Rohan* (Paris, 1889).

ROHAN, Louis René Edouard, Prince de (1734-1803). A French cardinal, born in Paris. He was bred to the Church, and was made Ambassador to Austria in 1772. He was recalled in 1774, having made himself offensive to Maria Theresa by his meddlesome spirit and scandalous mode of life. He became grand almoner of France, cardinal in 1778, and Bishop of Strassburg the next year. He was imprisoned (1785-86) for his participation in the affair of the diamond necklace (q.v.), and on his release was dismissed from Court in disgrace. He was a Deputy to the States-General in 1789, but retired on account of accusations of disloyalty. He resigned the Bishopric of Strassburg in 1801.

ROHDE, rō'de, Erwin (1845-98). A German classical scholar, born in Hamburg, and educated at Bonn, Leipzig, and Kiel. In the last named of these universities he became docent in 1870 and professor in 1872, and from 1876 to 1886 held chairs at Tübingen, Leipzig, and Heidelberg. He was an authority on the Greek novel and on the Greek cult of ghosts, and to these two subjects his great works, *Der griechische Roman* (1876), *Psyche* (1890-94), and the posthumous *Kleine Schriften* (1901), are devoted. Rohde wrote *Friedrich Creuzer und Karoline von Günderode* (1896).

ROHILKHUND, or **ROHILKHAND**, rō'hĭl-kŭnd'. A division of the United Provinces of Agra and Oudh (q.v.), British India, occupying, together with the native State of Rampur, an area of 11,824 square miles. Population, in 1901, 6,010,527. The principal town is Bareilly.

ROHLFS, rōlfs, Anna Katherine (Green) (1846—). An American novelist, daughter of J. Wilson Green, a lawyer of Brooklyn, N. Y. She married Charles Rohlfs in 1884. She was educated at Ripley College, Poultney, Vt., and gained immediate popularity by her first novel, *The Leavenworth Case* (1878), in which she combined remarkable ability in the construction of plot with considerable knowledge of criminal law. Of many later stories, all in the same vein, the best are: *A Strange Disappearance* (1879); *The Sword of Damocles* (1881); *Hand and Ring* (1883); *The Mill Mystery* (1886); *Behind Closed Doors* (1888); *The Forsaken Inn* (1890); and *The Filigree Ball* (1903). Other books are: *Risivi's Daughter*, a drama in blank verse (1880); *The Defense of the Bride*, a dramatic poem, together with other verses; and a dramatization of *The Leavenworth Case* (1892).

ROHLFS, Gerhard (1831-96). A German explorer, born April 14, 1831, at Vegesack, near Bremen. After serving in the Schleswig-Holstein War in 1849 he took up the study of medicine and from 1855 to 1860 participated in the French wars in Algeria as a surgeon in the Foreign Legion. In 1861-62 he explored Morocco in the disguise of a Mohammedan, and penetrated the desert hinterland to the oasis of Tafilet. Setting out from Tangier in 1863, he was the first European to reach and describe the oasis of Twat. Shortly after his return to Germany in 1865 he set out again for Africa, this time planning a journey through the heart of the Sahara and the Sudan. He traversed the desert from Tripoli to Lake Tchad, visited the Central African States of Bornu and Sokoto, and, entering the Niger by way of the Benue, sailed down that stream to Rabba, whence he forced his way through the forests to the Guinea coast. In 1868 he accompanied the British expedition to Abyssinia and after 1869 explored Cyrenaica and the oasis of Jupiter Ammon, traversing the Libyan desert, whither in 1873-74 he led a second expedition,

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equipped by the Khedive of Egypt. In 1878 he set out from Tripoli on a semi-official mission to the Sultan of Wadai, but, owing to the hostile attitude of the desert tribes, was compelled to turn back at Kufra. The long list of his works comprises: *Reise durch Marokko* (1869); *Land und Volk in Afrika* (1870); *Von Tripolis nach Alexandria* (1871); *Quer durch Afrika* (1874-75); *Beiträge zur Entdeckung und Erforschung Afrikas* (1876); *Reise von Tripolis nach der Oase Kufra* (1881); *Quid Novi ex Africa* (1886).

ROI D'YVETOT, LE (Fr., the King of Yvetot). The title of a poem by Biranger (1813), telling of the contented King of the insignificant little mediæval principality of Yvetot, near Rouen. The King of Yvetot's happy though inglorious life was intended to satirize Napoleon's insatiable love of glory for which the nation paid so heavily. The name has since been used of petty princes with great pretensions.

ROI S'AMUSE, rwä sȧ'mȳz', LE (Fr., the King amuses himself). A drama by Victor Hugo produced in 1832. The King, Francis I., is ruled in his excesses by his buffoon Triboulet, whose daughter Blanche he seduces. In revenge Triboulet plans the murder of Francis at a low tavern he frequents, but when he plunges his victim in a sack, he finds it is Blanche who had followed her lover and met her death. The story was used by Verdi as the basis for the libretto of his opera *Rigoletto* (1851), Francis appearing as the Duke of Mantua.

ROIS EN EXIL, rwä zän nĕg'zēl', LES (Fr., Kings in Exile). A story by Alphonse Daudet (1879), dealing with the misfortunes of crowned heads, and notable in its close study of character and motive.

ROJAS, rō'hȧs, FERNANDO DE. A Spanish writer, who flourished about 1500; the author of the greater part if not the whole of the famous dramatic novel entitled the *Tragicomedia de Calisto y Melibea*, also known as the *Celestina*, a work produced first in 1499. Nothing is known of the life of Rojas beyond the fact that he was a bachelor of laws. According to a statement made in the preface of the work by Rojas himself, he was only continuing the work of another man, who had written the first act of the *Celestina*. Despite its title, the *Celestina* is not a drama; it is properly a novel in dialogue, and as such it had a very great influence upon the later novel and drama of Spain. Consult the edition of the *Celestina* in the *Biblioteca de autores españoles*, vol. iii. and M. Menendez y Pelayo's essay on Rojas in his *Estudios de crítica literaria* (Madrid, 1895).

ROJAS ZORRILLA, thō-rē'lyȧ, FRANCISCO DE (1607-c.1660). A Spanish dramatist. He belongs to the second half of the *siglo de oro*, the age of Calderon, and produced plays in collaboration with that illustrious poet, with Velez de Guevara, and with Mira de Amescua, as well as notable original comedies. He also cultivated the sacred play or *auto*. The best known of his pieces is that entitled *Del rey abajo ninguno*, still interesting on the stage. Other noteworthy comedies of Rojas are *Lo que son mujeres* and *Entre bobos anda el juego*. He himself published two volumes of his works, comprising some twenty-four plays, in 1640 and 1645. Some of his more important plays are to be found in the *Biblioteca de autores españoles*, vol. xxxix. (Madrid, 1866).

ROKITANSKY, rō'kȧ-tän'skē, KARL, Baron (1804-78). An Austrian pathologist, born in Königgrätz, Bohemia. He studied medicine in Prague and Vienna; was appointed assistant to the chair of pathological anatomy in the University of Vienna in 1828, and professor in 1834, retiring in 1875. He occupied several municipal medical positions. In 1869 he was elected president of the Austrian Academy of Sciences. Rokitansky, more than any other one man, deserves the credit of establishing the scientific study of medicine upon the basis of pathological anatomy. He published *Handbuch der pathologischen Anatomie* (3d ed. 1851-61; Eng, trans. 1849-52), which embodied his teachings. Consult anonymous biography (1874).

RO'LAND, *Fr. pron.* rō'län', THE SONG OF. An old French epic poem or *chanson de geste* of the end of the eleventh century, pronounced by competent critics one of the masterpieces of French literature. The work, consisting of 4002 assonant verses in decasyllabic form, arranged in *laisses* or stanzas of varying length, takes its name from its chief character, Roland, prefect of Brittany, and, according to tradition, nephew of Charles the Great. Nothing definite is known concerning its author, though some commentators identify him with a certain *Turoldus* mentioned in the last verse. The narrative of the poem runs briefly as follows: Charles, King of the French, has for seven years successfully fought the 'Saracens' of Spain. News of his victories reaches Marsíle, commander of the infidels, who, fearing for his own sceptre, sends messengers to the French to sue for peace. After deliberation, Charles appoints Ganelon, the personal foe of Roland (here represented as Roland's stepfather), to arrange terms with Marsíle. Incited by his bitter hatred of Roland, Ganelon seizes the opportunity to gratify his desire for vengeance. Having reached the 'pagan' court, he artfully proposes to Marsíle to betray the French rearguard under Roland into Marsíle's hands, when the main army of Charles shall be fairly on its way home. The plan is accepted; Ganelon returns to Charles, and the French army crosses the Pyrenees into France, while Roland remains behind in the mountains with a guard of twenty thousand men. At Roncevaux, or as the text says Rencesvals (the plain of Ros), he and his valiant band are overwhelmed by a 'pagan' army of twenty times their number. The details of this disaster, which Europe regarded during centuries as the representative struggle of Christian against Moslem, constitute the kernel and real beauty of the poem. The effect of the drama is heightened by making the heroic but reckless Roland in part responsible for the catastrophe. His boon companion Oliver, whose courage is second only to his prudence, in three beautiful *laisses* (each on a different assonance) beseeches Roland to wind his horn and bring Charles to the rescue. Only when his doom is complete, when his companions, the twelve peers of France, including the warlike Bishop Turpin, lie slain about him, will Roland raise the horn to his lips and summon his liege with his dying breath. The poem then draws rapidly to a close. Charles, at whose prayer the Almighty arrests

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the sun in its course, reënters Spain on the same day, utterly routs the 'pagans,' and returns to France, sorrowful but triumphant. At the tidings of Roland's death, Alde, his betrothed (Oliver's sister), falls lifeless at the Emperor's feet. Ganelon is finally found guilty by the 'judgment of Heaven' and is condemned to be torn 'limb from limb' by infuriated stallions.

In this form the *Chanson de Roland* was carried to almost every nation in Europe. It was put into German verse by a certain Conrad about 1130, later into Norse prose and into English verse; the story early penetrated to Italy; it was known to Dante, and after several recastings it was adapted to the national character by the poets Pulci (*Morgante maggiore*), Boiardo (*Orlando innamorato*), Ariosto (*Orlando furioso*), and Berni (*Orlando amoroso*). In Spain national jealousy displaced religious zeal. Roncevaux became a Spanish victory, and the dawn of Spain's national glory. Finally the legend cast abroad the names of its heroes, some of which became localized in foreign parts, notably 'Roland' in Northern Germany about Bremen. The legend is also the theme of several operas.

The historical facts underlying the story are told by Einhard, the biographer of Charles the Great. He relates that on August 15, 778, while passing through a defile of the Pyrenees, part of the French army was attacked by the mountaineers, the Basques, who, owing to their light armor, gained an easy victory. In this battle perished "Eggihard, provost of the royal table; Anselm, count of the palace; and Roland (*Hruotlandus*), prefect of the March of Brittany." This is the sole dictum of history on the hero's character. But two Latin works, a chronicle of the twelfth century attributed to Turpin, and a poem *De Proditione Guenonis* of the same date, reveal two versions of the legend preceding that represented by the French poem. From evidence in these works it is held that the legend of Roland was first fashioned in Brittany, recast in Anjou, and given its present form in the country surrounding Paris or the *Ile de France*. The best manuscript of the French poem is the famous "Digby 23" of the Bodleian Library, Oxford; it is apparently in the writing of a scribe of the middle of the twelfth century.

As a literary production, the *Chanson de Roland* is worthy to be classed with the two other great mediæval epics, the *Beowulf* and the *Nibelungenlied*. Doubtless they are both its superiors on the æsthetic and human sides; each of them is a more or less complete expression of a past stage of civilization, whereas the *Roland* represents only a part of the French nation, the feudal *barons*. Yet, in its rough grace, it excels them both in directness, and, above all, in the expression of a national spirit.

BIBLIOGRAPHY. Consult: Seelmann, *Bibliographie des altfranzösischen Rolandsliedes* (Heilbronn, 1888). The best editions of the text are by Gautier (Tours, 1899); by Müller (Göttingen, 1878); by Stengel (Leipzig, 1900). For criticism consult especially G. Paris, *Poèmes et légendes du moyen âge* (Paris, 1900). Translations: J. O'Hagan (London, 1880) in the metre of "Christabel"; Rabillon (New York, 1888) in blank verse; an excellent German translation is that of William Hertz (Stuttgart, 1861); and by far the best in modern French is the blank verse translation of Joseph Fabre (Paris, 1902).

ROLAND DE LA PLATIÈRE, de là plâ'-tyâr', JEAN MARIE (1734-93). A French politician, born at Thizy, near Villefranche (Yonne). He was early forced to shift for himself, but succeeded in becoming an authority in matters pertaining to industry and commerce and received an appointment as inspector ordinary of manufactures at Amiens. In 1775 he met Marie Jeanne Philipon, a young woman twenty years his junior, of brilliant genius and fascinating beauty, and they were married February 4, 1780. When the Revolution broke out in 1789, Roland, who was then living at Lyons, became a decided partisan of the movement. In 1791 he was sent to Paris by the municipality to present to the Constituent Assembly the deplorable condition of the Lyonnese weavers. After the dissolution of the Constituent Assembly, he founded at Lyons the Club Central, the members of which, marked by their attachment to constitutional liberty, received the name of Rolandins. Toward the close of 1791 he settled in Paris, and soon became one of the recognized leaders of the Girondists. In March, 1792, he was appointed Minister of the Interior, a post which, with the exception of the period between June 10 and August 10, 1792, he held till January, 1793, when he resigned in despair of seeing moderate counsels adopted. Upon the fall and proscription of the Girondists he fled and concealed himself in Rouen. When news reached him of the execution of his wife, he committed suicide at a small village in the environs of Rouen, November 15, 1793. Roland wrote and published several memoirs and disquisitions on branches of industry, the most important work being the *Dictionnaire des manufactures et des arts* (Paris, 1785-90). His letters to his wife before they were married have also been published in part.

ROLAND DE LA PLATIÈRE, MARIE or MANON JEANNE PHILIPON, Madame (1754-93). A leader of society at the time of the French Revolution. She was the daughter of Pierre Gratien Philipon, an engraver, and was born in Paris, March 17, 1754. At an early age she showed great precocity, being especially attracted by the works of great poets and moralists. When eleven years of age she entered a convent school in Paris, but soon returned to her parents and gave herself up to fresh reading and study. She was speedily attracted by the philosophical ideas of Rousseau and the Encyclopædists. In 1780, after a friendship extending over five years, she married Jean Marie Roland de la Platière, and her subsequent career is closely identified with his political life. During the Revolution she became prominent in Parisian literary and political life, and her *salon* was frequented by Brissot, Buzot, Pétion, and other Girondist leaders. After the fall of the Girondists and Roland's flight from Paris, his wife continued to support the lost cause. She was arrested June 1, 1793, and lodged in prison, where she spent her time in writing her *Mémoires* (4 vols., edited by Dauban, Paris, 1864). She also composed four letters to Buzot, who alone of her admirers had awakened deeper sentiments than those of friendship. Their mutual love had been, however, a blameless one. After a summary trial before the Revolutionary Tribunal, Madame Roland was led to the guillotine and bravely met death, November 8, 1793. Consult: Dauban, *Etude sur Madame Roland*

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(Paris, 1864); Blind, *Madame Roland* (ib., 1886); Lamy, *Deux femmes célèbres* (ib., 1886); Sainte-Beuve, *Portraits de femmes;* Dobson, *Four Frenchwomen* (London, 1890). Madame Roland's *Lettres* have also been published (Paris, 1867).

ROLFE, rôlf, JOHN (1585-1622). An English colonist in America, born in Norfolk, England. He became interested in the colonization of Virginia, and in June, 1609, started for the colony, but was wrecked on the way, was detained for some months on the Bermuda Islands, and did not reach Jamestown until May, 1610. He is credited with having been the first Englishman, in 1612, to introduce the cultivation of tobacco in Virginia. He had married an English woman in 1608, but his wife had died soon after her arrival at Jamestown, and in April, 1613, he married the famous Indian 'princess' Pocahontas, whom he took to England in 1616. After the death of Pocahontas, in 1617, Rolfe returned to Virginia, where he again married, and in 1619 was a member of the Council. See POCAHONTAS.

ROLFE, JOHN CAREW (1859—). An American classical philologist, born at Lawrence, Mass. He received his bachelor's degree from Harvard University in 1881, and attained the doctorate in philosophy at Cornell in 1885. In 1888-89 he was a member of the American School at Athens and assisted in important excavations during that year. He taught at Cornell University from 1882-85 and at Harvard University in 1889-90. In the latter year he was appointed assistant professor at the University of Michigan, and four years later was made professor of Latin. This office he continued to hold until 1902, when he was appointed to a similar position at the University of Pennsylvania. He became co-editor with Prof. Charles E. Bennett of Cornell of the *College Latin Series*, and edited various Latin texts for schools and colleges.

ROLFE, ROBERT MONSEY, Baron Cranworth. See CRANWORTH.

ROLFE, WILLIAM JAMES (1827—). An American Shakespearean scholar and educator, born in Newburyport, Mass. Rolfe graduated B.A. at Amherst in 1849. He taught in Maryland, then at Wrentham, Dorchester, Lawrence, and Salem, and from 1862 to 1868 in Cambridge, Mass. Having resigned this post, he became editor of the *Popular Science News* and afterwards of the Shakespearean department of *The Literary World* and *The Critic*. Early in his career he edited selections from Ovid and Vergil, and, in collaboration, *The Cambridge Course of Physics* (6 vols., 1867-68). Many contributions by him are scattered through the *North American Review*, *Harper's Magazine*, and other periodicals. His Shakespearean work began with an edition of George L. Craik's *English of Shakespeare* (1867). This led to the preparation of a complete edition of Shakespeare (40 vols., 1870-83), a revision of which began to appear in 1903. He also edited the *Select Poems of Goldsmith* (1875), of *Gray* (1876), and of *Tennyson* (1884); *The Princess* (1884); *Mrs. Browning's Sonnets from the Portuguese* (1887); *Enoch Arden and Other Poems* (1887); *Scott's Complete Poems* (1887); *A Blot in the 'Scutcheon and Other Dramas of Browning* (1887); *Byron's Childe Harold* (1887); *Minor Poems of Milton* (1887); *Macaulay's Lays of Ancient Rome* (1888); *Wordsworth* (1888); *In Memoriam* (1895); *Idylls of the King* (1896); and a complete edition of Tennyson (10 vols., 1898). Other books are: *Shakespeare the Boy* (1896); *The Elementary Study of English* (1896); *Life of Shakespeare* (1901); and *A Satchel Guide to Europe*, published anonymously for twenty-seven years.

ROLL, rôl, ALFRED PHILIPPE (1847—). A French genre and portrait painter of the Naturalistic School, born in Paris. He was the pupil of Harpignies, Gérôme, and Bonnat. Many of his subjects are taken from the life of the peasant. These include "The Strike" (1880), in the Museum of Valenciennes and "Work" (1885). "The Centenary of the 5th of May, 1779, at Versailles," "War" (1887), and "The National Fête of the 14th of July, 1880," are other notable canvases, which show his power of depicting several figures in action. He was influenced by the Impressionists to the extent that he rarely painted any figure except out of doors. His "In Normandy" (1883); "Manda Lamétrie, fermière" (1888), in the Luxembourg; "The Exodus"; and the superb "Woman with a Bull" (1889) are examples of his delicate handling of light. His skill as a draughtsman is best exhibited in "The Joys of Life" (1892-96), a decorative painting in the Hôtel de Ville, Paris. He also painted portraits. Consult Fourcaud, *L'œuvre de Alfred Philippe Roll* (Paris, 1896).

ROLLE, rôl, RICHARD, OF HAMPOLE (c.1290-1349). An English recluse and author, born at Thornton, in Yorkshire. He studied theology at Oxford, but he left the university at the age of nineteen, and became a hermit. He moved about in the north, settling eventually in a cell at Hampole, near Doncaster. He was famed for his learning, preaching, and holy life. Rolle composed many treatises both in Latin and in English, some of which yet remain in manuscript. His English works, written in the Northumbrian dialect, were widely read. Most popular was *The Pricke of Conscience* (ed. R. Morris for the Philological Society, 1863), a poem of 9624 lines rhyming in pairs. It gives a complete view of human life from the extreme ascetic standpoint. Other English works by Rolle are a paraphrase of the *Psalms and Canticles* (ed. by Bramley, Oxford, 1884); *English Prose Treatises*, ten in number (edited by Perry for the Early English Text Society, London, 1866); and the *Miscellanies* edited by Horstmann, under the title *Richard Rolle of Hampole and His Followers* (2 vols., London, 1895-96). Two of the Latin treatises—*De Emendatione Vitæ* and *De Incendio Amoris*, translated into English by Richard Misyn in the fifteenth century, were edited by R. Hardy for the Early English Text Society (London, 1896). Rolle's English works are of great philological interest as specimens of the English written in the North.

ROLLER. A bird of the family Coraciidæ, related to the broadmouths, todies, and motmots. All the many rollers are inhabitants of the warm and forested parts of the Old World, and are noted for gorgeous coloring. They take their name from a habit of tumbling in the air like a tumbler-pigeon, and have a curious habit of tossing their food, which consists of insects and parts of plants, into the air, and catching it in their mouths. One only is found in Europe, the

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common roller (*Coracias garrula*), a bird nearly equal in size to a jay. Besides the genus Coracias, there are the broad-billed rollers of the genus Eurystomus, found in Africa and tropical Asia, and at least four genera of remarkable rollers confined to Madagascar.

ROLLERS. See ROAD AND STREET MACHINERY.

ROLLER WORM, or ROLLWORM. The larva of a hesperid butterfly (*Eudamus proteus*), which rolls the leaves of beans and peas in the Southern Atlantic States. The large eggs are laid upon the leaves in clusters of from four to six. The larva, which is yellow-green and has a slender neck and large head, cuts a slit in the leaf from the edge, rolls the flap around its body, and works from the inside of this roll with its soft parts perfectly protected. When fully grown it is 1.5 inches long, and transforms to a chrysalis within the leaf-roll. The adult butterfly is dark brown, the front wings having several silvery white spots. In a small garden it may be kept in check by hand-picking, but the use of an arsenical spray is necessary in large fields.

ROLLETT, HERMANN (1819-1904). An Austrian poet and art critic, born in Baden, near Vienna. Because of the radical tone of his political poetry, *Frühlingsboten aus Oesterreich* (1845), published while he was in Germany, he was forbidden to return to Austria, and was later expelled from several German States. His principal works are: *Frische Lieder* (1848, 2d ed. 1855); *Republikanisches Liederbuch* (1848); *Die Kirmes*, a series of songs, with music by Abt (1854); *Offenbarungen* (2d ed. 1870); and *Märchengeschichten aus dem Leben* (1894). Rollett wrote some dramas and also two valuable works on art, *Die drei Meister der Gemmoglyptik* (1874), and *Die Goethe-Bildnisse* (1882).

ROLLIN, rô'lăn', CHARLES (1661-1741). A French historian, born in Paris. He studied at the Collège du Plessis, where, in 1683, he became assistant to the professor of rhetoric, and five years later he was made professor of eloquence in the Collège de France. In 1694 he was chosen rector of the University of Paris, a dignity which he held for two years, distinguishing himself by many useful reforms. In 1696 he was appointed coadjutor to the principal of the Collège de Beauvais; but being an ardent Jansenist, he was removed in 1712, through the influence of his opponents. In 1715 he published an edition of Quintilian, and in 1726 the *Traité des études*, his best literary performances. After a long life of retirement devoted to writing and study, Rollin died in Paris, September 14, 1741. His most famous work is the compilation, formerly of great popularity, known as the *Histoire ancienne* (13 vols., Paris, 1830-38), which has frequently been reprinted and reëdited both in French and in English, but is of little historical value. He also began a *Histoire romaine*, which was completed by Crevier and other historians after Rollin's death, and was published in 9 volumes (Paris, 1738-48).

ROLLIN, LEDRU-. See LEDRU-ROLLIN.

ROLLING MILL. An establishment provided with machinery for working metal ingots into rails, bars, plates, rods, and structural shapes by repeatedly passing them when intensely hot between cylindrical rolls. The three principal methods of working metals are founding, forging, and rolling, and of these three methods that of rolling has been chiefly instrumental in extending the use of metal for structural purposes to its present enormous dimensions. The rolling mill was invented by Henry Cort, an Englishman, in 1783, and although wonderfully developed in its essential principle, the device has undergone but little change since its invention. Rolling mills may be classified as two-high mills, three-high mills, and four-high mills, with their modifications. The accompanying diagrams show the principle of operation of each of these mills. Fig. 1 indicates a *two-high* mill in which the metal passes between the two rolls in the direction indicated by the lower arrow and has work done on it and then is returned over the rolls as indicated by the upper arrow for the second pass. In the *three-high* mill, indicated by Fig. 2, the metal passes forward between the bottom and middle rolls and is returned between the middle and top rolls and has work done on it in both the forward and return passes. The *four-high* mill, as shown by Fig. 3, consists essentially of two two-high mills placed one above the other nearly, and working in opposite directions so that the metal is acted upon during both the forward and return passes. In actual practice the four-high mill is seldom used. The original mill invented by Cort was a two-high mill operating as indicated by Fig. 1. As will be seen, the metal after each forward pass had to be returned over the top of the mill, without any work being done on it, to get it into position for the next forward pass. This operation, it will be readily understood, necessitated a material loss of time and heat while the metal was being returned for each succeeding pass through the rolls. The first great improvement of the two-high mill was designed to avoid these losses and consisted in operating the rolls by a reversing engine, which, as soon as the metal had completed the forward pass, reversed the direction of the rotation of the rolls and permitted the metal to be returned between them. The chief disadvantages of reversing were that more expensive engines were required, the whole machinery had to be heavier and more costly in construction, and the expense of repairs was greater. The three-high mill, as will be seen from Fig. 2, has the great advantage over the two-high mill that the rolls operate all the time in one direction. On the other hand, the metal has to be lifted for each return pass. In modern rolling-mill practice, the lifting is done by hand when light material such as rods, bars, hoops, etc., is being rolled and by machinery when the material is heavy.

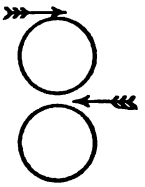

FIG. 1.

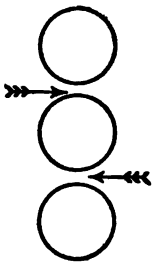

FIG. 2.

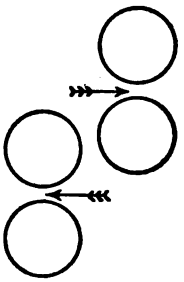

FIG. 3.

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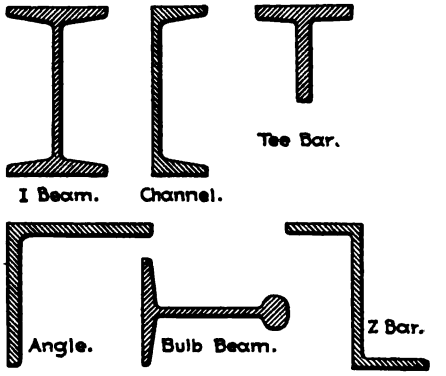
The construction of a set or stand of rolling-mill rolls is quite simple. The rolls are made of chilled cast iron turned to cylindrical form and are journaled at their ends in a strong frame or housing of cast iron. It is essential above all things that this housing shall be strong and rigid and so constructed that the rolls can be taken out and repaired or changed quickly and easily. Sometimes the rolls are so fixed and adjusted in the housing that their distance apart can be quickly increased or decreased while they are in place, and at other times they are placed in the housing in a definite fixed position which cannot be changed during operation. The housing is founded on a structure of masonry set below the mill floor. In finishing mills for light work the engine is sometimes connected only to one roll, the other roll being turned by the friction of the metal as it passes between the two. For heavier work both rolls are positively operated direct from the engine. The simplest form of roll is a plain cylindrical one for rolling plates. For rolling nearly all other forms of rolled shapes the metal has to be confined laterally, and to accomplish this the rolls are provided with grooves varying in shape according to the finished form it is desired to secure. Generally each set of rolls has two or more grooves, each set of which approaches closer to the form of the finished section than the set of grooves preceding it, and the metal is passed through these grooves in order. Commonly also several sets of rolls are employed, each set of which brings the piece closer to its final form than the set preceding. In certain kinds of work the several stands of rolls are so arranged that the rolling process is continuous. For example, in rolling round rods for wire-drawing, the billet from the blooming mill passes through one groove, then is looped and returned through another, and so on until the final groove of the final stand of rolls produces the finished rod of small diameter. In the universal mill largely used in rolling plates the metal is compressed laterally by means of a pair of vertical rolls set close behind the horizontal rolls. There are also special forms of mills for rolling wheel tires, hoops, and other special shapes.

The mills of the Pencoyd Iron Works, at Pencoyd, Pa., may be described as typical of modern practice. The steel ingots as produced by the steel plant (see IRON AND STEEL) are delivered by electric traveling cranes and cars to the pit furnaces of the blooming mill, where they are subjected to the first rolling process to reduce them to blooms and billets. The blooming mill is a two-high reversing mill, and the ingots are delivered to it and manipulated between the different passes by 'tables' operated by hydraulic power from a central station. These tables raise, turn, and shift the piece transversely or longitudinally as desired. This mill is fed with hot ingots by four vertical pit furnaces of the regenerative type fired with producer gas, and in turn it supplies three finishing mills and an axle forge. The principal part of the product goes to the beam mill, which is supplied with hot blooms. The beam mill is placed in the line of the delivery of the blooming mill and is served with three regenerative heating furnaces for restoring full working temperature to the blooms on their passage from the blooming mill. The billets are charged into and withdrawn from these furnaces by machinery. The beam mill consists of two distinct mills, one a roughing mill for roughly forming the beam and the other a finishing mill. The roughing mill is a two-high reversing mill and the finishing mill is of the three-high type. The roughing mill is served with reversing tables and hydraulic manipulators, while the finishing mill has traveling tables which also have a lifting movement. The product of the finishing mill is delivered by live rollers to saws and shears, thence to cooling beds, straightening machines and shears, and finally to the storage yards. From the time the ingot leaves the steel mill until the finished beam is in the storage yard it is handled wholly by machinery. The foregoing is a typical example of the perfection of modern rolling-mill practice in producing structural iron and steel. In rolling rails the billet from the blooming mill passes directly to a three-high rail mill.

STEEL SHAPES. The shapes turned out by the modern rolling mill are limited only by the fact that they must in each case be of uniform section throughout the length of the piece, and the fact that the roller grooves cannot be wider at the bottom than the top. The more common standard shapes are plates, flats, squares, rounds, half-rounds, angles, channels, I beams, Z bars, T iron,



STRUCTURAL STEEL SHAPES.

trough shapes, rails, and bulb angles. In structural work these direct shapes are riveted together to form the various compound shapes used for columns for buildings, bridge members, etc. The literature on rolling-mill construction, equipment, and practice exists almost wholly in the shape of special articles in the *Proceedings* of the various engineering societies and in the columns of the engineering papers.

ROLLO, HROLF, ROLF, or ROU (real name HROLFE, known as the Ganger, or Walker). A Norse chieftain of whose early history nothing definite is known. He seems to have effected extensive conquests in Northwestern France, and by the Peace of Clair-en-Epte, about 912, he was granted by King Charles the Simple of France the possession of Rouen and the adjacent territory which he already held. This was the origin of the Duchy of Normandy. Rollo was baptized with many of his companions. He divided his lands among his followers, framed laws for his people, and made great donations to the Church. He was a faithful ally of Charles the Simple. By successful wars he gradually extended his possessions. About 927 he associated his son William Longsword with himself as ruler. He

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died about 931. Consult Freeman, *The Norman Conquest*, vol. i. (Oxford, 1867). See NORMANS.

ROLLS. The records of the ancient English courts. The term originated at a time when bookbinding was not common, and it was the custom to write the records of court proceedings upon sheets of parchment, which were tacked or fastened together and rolled up. See RECORDS, PUBLIC.

ROLLS, MASTER OF THE. See MASTER OF THE ROLLS.

ROM, or **ROMANY.** See GYPSIES.

ROMAGNA, rō-mä'nyä. A territorial division of Italy which formed part of the Papal States (q.v.). It embraces the provinces of Bologna, Ferrara, Forlì, and Ravenna.

ROMAGNOSI, rō'mä-nyō'zē, GIOVANNI DOMENICO (1761-1835). An Italian jurist, born at Salsomaggiore. He was educated at Piacenza, and became instructor in law at Parma (1803), and in 1806 professor of law at Padua. The downfall of Napoleon caused him to leave the last place and he became professor of law at the University of Corfu in 1824. Romagnosi in his teaching extolled society as the natural condition of man, upheld the State against the individual, and repudiated the contract theory of the origin of society. His two most important works are the *Genesi del diritto penale* (1786) and *Introduzione allo studio del diritto pubblico universale* (1805). His *Opere* were published at Florence in 1832-35. While imprisoned by the Austrians in 1800, Romagnosi is said to have anticipated Oersted in the discovery of the magnetic needle.

ROMAIC (ML. *Romaicus*, from Gk. *Ῥωμαϊκός*, *Rhōmaikos*, Roman, Latin, Byzantine, from *Ῥώμη*, *Rhōmē*, Lat. *Roma*, Rome, later also Byzantium). The vernacular language of modern Greece. See the section on *Modern Greek* in the article GREEK LANGUAGE.

ROMAIC LITERATURE. The modern Greek literature. It is commonly regarded as belonging to the period that begins after the overthrow by the Turks of the Byzantine Empire in A.D. 1453. But the beginnings of Romaic literature considered as the written expression of Romaic speech must be sought at least three centuries earlier. Theodoros Prodromos (Ptochoprodromos), who flourished in the first half of the twelfth century, has been considered the first modern Greek writer. His begging poems, written in the so-called political verse and in the vulgar language, are a most interesting literary and linguistic monument. But Prodromos is by no means the first Romaic writer. The popular epic material out of which the metrical romance of Diogenes Akritas was afterwards constructed appears to belong to an earlier period, and Romaic prose documents composed in Lower Italy carry us back to the tenth century. The metrical *Chronicle of the Conquest of the Morea*, which deals with the foundation of the feudal principalities in Greece after the Fourth Crusade, was composed before 1326. In the earlier period, as it may be called, of Romaic literature, Constantinople, Cyprus, and Crete appear to have been the chief centres of production. Didactic, erotic, and allegorical poetry, legal and historical writings in prose, are among the forms of literature represented. To a Cretan poet of Venetian origin, Vincenzo Cornaro, who flourished apparently about 1550, belongs with some right the title of the modern Homer. His long romantic poem *Erotocritos*, in which, in the mediæval manner, the loves of Erotocritos, the son of an Athenian courtier, and Aretusa, the daughter of Heracles, King of Athens, are narrated, is still a great favorite with the Greek populace. Greek prose writing from the fall of Constantinople to the latter half of the eighteenth century represents substantially but the continuation and propagation of the later Byzantine literature and scholarship. But during the period of Turkish rule, particularly in Northern Greece, a mass of most striking and interesting popular poetry, composed and transmitted unwritten, was accumulating. In this popular poetry the life, the emotions, the superstitions of the Greek people are reflected. In the so-called Klephtic songs, in which is vividly portrayed the spirit of the wild mountaineers of Thessaly and Epirus, who were sometimes a sort of local police in Turkish pay, sometimes brigands, we find expressed that love of liberty and hatred of the oppressor which were to culminate in the Revolution of 1821. Noteworthy among these poems is the *Quarrel of Olympos and Kissavos* (Ossa), which was translated, together with other popular Romaic poems, by Goethe. Of others of the poems "love and love's pain" is the burden; of yet others, death and Charos, the modern Greek death-god, are the theme. The prophet of the spirit of liberty, which was gaining greater power under the influence of the French Revolution, was Rhegas of Velestinos (Pheræ) (1754-98). Rhegas, who lived in the service of the Greek Hospodar of Wallachia and who paid the price of his patriotism with his life, is the author of the rousing war-song, "On, sons of the Hellenes!" The stirring poem, "How long, pallicars?" is also commonly ascribed to him. Of a different type was the man who has been often regarded as the modern Greek Anacreon, Athanasios Christopulos (1770-1847), who spent what would seem to have been an epicurean existence at Bucharest, imitating the *Anacreontica* in Romaic and troubling himself little about the regeneration of Greece. Noteworthy also is the satiric fabulist Ioannes Velaras of Epirus (1773-1823), who was physician to Veli Pasha, son of the infamous Ali Pasha of Janina. Among the cultivators and developers of Romaic prose style, a very prominent place should be given to the first great modern Greek scholar, Adamantios Koræs (Coray) (1748-1833), who left his mark upon classical, as well as modern, Greek philology. He took a middle position in the strife that arose at the beginning of the revival of national life between the purists and the vulgarists in Romaic speech and writing. The current Greek style of to-day occupies in general this vague middle ground, but the most vital and original literature of the Greeks is still, in poetry at least, in the vulgar tongue.

It was in this tongue, and in that form of it which was current in the Ionian Islands, that the great poet of the Greek Revolution, Dionysios Solomos, wrote. Solomos is a writer of real and eminent genius. He was born in Zante, in 1798, was educated in Italy, where he studied law at Venice, Cremona, and Padua, and developed his literary knowledge and poetic talent by association with the poets of the day, particularly Monti, and by reading the Italian

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classics. On his return to Zante in 1818 he began to study popular Romaic poetry with the practical help, it is said, of an old blind minstrel. The Klephtic lays were a new inspiration to him. Perhaps the greatest production of Solomos's genius is his *Hymn to Freedom*, the composition of which was prompted by the first triumphs of the Greek Revolution. Not the least striking passage in this great poem is that in which the innumerable company of the ghosts of those that had been "slain by Turkish wrath" inspire by their unfelt touch the sleeping Greek army before Tripolitza. The *Hymn to Freedom* has been set to fit music and is now the national hymn of Greece. The poem *On the Death of Byron* is also a noble work, though written in a difficult and involved style. Among the shorter poems of Solomos may be mentioned *The Poisoned Girl*, weirdly pathetic; *The Blond Girl;* and the six lines—a true *multum in parvo*—on the island of Psara after its devastation by the Turks. Solomos died in 1857, in Corfu, where he had spent the latter part of his life. To what may be called the school of Solomos belong Julius Typaldos of Cephalonia (1814-83) and G. Markoras of Corfu (1826—). A poet of distinct merit, who belongs to the western islands, but drew his inspiration as well as his blood from the hardy Epirotes, is Aristoteles Valaorites of Santa Maura (Leucas) (1824-79). Another poet, able but too much influenced by the puristic style, is George Zalakostas (1805-58). Of merit, too, as a lyric poet, is Achilles Paraskhos (1833-95). Among the numerous Greek poetical writers of lesser merit since the Revolution may be mentioned the widely learned and over-classical Alexander Rizos Rangabes (Rangabé) (1810-92), who devoted himself to various fields of literature, and Alexander Soutsos (1808-63), who contributed by his satiric verse to the unpopularity of the unfortunate President Capodistria. Demetrios Bikelas, of whom more must be said presently, is better known as a prose writer than as a poet, although he has written graceful verse and made poetical translations of a number of Shakespeare's plays. Another writer of verse holds a unique place in modern Greek literature. This is George Soures, who for many years published weekly a small, four-page, satirical paper, the Ῥωμηός, roughly illustrated by himself and written in clever doggerel. His very personal, slashing satire, combined with poetic talent, caused Soures to be called by some the modern Aristophanes. In dramatic writing, as in fiction, the modern Greek writers have for the most part owed far too much to French models; but the comedy Βαβυλωνία, published in 1836 by D. K. Byzantios (a painter by profession), in which a comical entanglement is caused by the failure of the several characters rightly to understand one another's dialect and which contains a good deal of clever satire on the confused state of the modern tongue, should not be passed over. Worthy of mention, too, are the comedies of Angelos Vlakhos (published 1871). A very prominent place in modern Greek fiction is held by Demetrios Bikelas, who was born at Hermopolis, in Syra, in 1835. His Διηγήματα (Stories) give us vivid glimpses of the life of the Ægean Islands. They have been gracefully translated into English (from the French edition) by Opdycke, under the title *Tales from the Ægean* (Chicago, 1894). A brief but vivid picture of Western Greece is presented in Bikelas's letters to a friend, entitled Ἀπὸ Νικοπόλεως εἰς Ὀλυμπίαν (*From Nicopolis to Olympia*), which have also appeared in a French version. Here may be mentioned as other important modern Greek historical works the elder Tricoupis's *History of the Greek Revolution* and Paparrhegopoulos's *History of the Greek People.* An historical novelist, as well as a literary critic of keen taste and sound judgment, is Emmanuel D. Rhoides, author of Πάπισσα Ἰωάννα (*Pope Joan*), a Rabelaisian historical satire published in 1867. Ordinary Greek journalism, generally of a very inferior sort, hardly falls, for the most part, within the scope of a survey of modern Greek literature; but mention should be made of the Ἑστία, an excellent literary journal published at Athens. In the domain of scholarship the Greeks have accomplished much, notably in archæology and philology. The National University, founded under Otho, the first King of the Greeks, has in its faculties men of international fame. Among these is the greatest living native scholar in later Greek, Hatzidakes. Constantine Kontos, who taught for many years at the university, was closely associated with the Dutch philologists, especially Cobet. The Λόγιος Ἑρμῆς, in the composition of which he was assisted by Cobet and Badham, the Γλωσσικαὶ Παρατηρήσεις (aiming at the purification of the modern written language), and numerous contributions to the learned periodical Ἀθηνᾶ are monuments of Kontos's great scholarship.

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ROMAINE, rō-mān′, WILLIAM (1714-95). An English clergyman noted for his 'evangelical' and Calvinistic preaching. He was born at Heathpool, the son of a French Protestant refugee. He was educated at the grammar school of Houghton, graduated at Christ Church, Oxford, 1734; was ordained in 1738, and immediately obtained a curacy near Epsom. In 1748 he published the first volume of a new edition of Calasio's *Hebrew Concordance and Lexicon*, the fruit of seven years' labor. The same year he was chosen lecturer of Saint Botolph's, in London, and in 1749 lecturer of Saint Dunstan's-in-the-West. In 1750 he was appointed assistant morning preacher at Saint George's, but was afterwards deprived of the situation by the

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rector, Dr. Trebeck, who was jealous of his popularity and averse to the 'plainness' of his preaching. His 'evangelicalism' grew with his years, and at length, in 1757, in a sermon on *The Lord Our Righteousness*, it became so offensive to the dons of Oxford that the university pulpit was in future closed against him. In 1756 he became curate and morning preacher at Saint Olave's, Southwark, in 1759 at Saint Bartholomew the Great, near West Smithfield. In 1766 he was chosen by the parishioners rector of Saint Andrew of the Wardrobe, and Saint Anne, Blackfriars, both in London, an office which he held till his death. His works were republished in a collected form, in 8 vols., in 1796, by Cadogan, with a life of their author.

ROMAN, rō'mān, or **ROMANU**. A town of Rumania, capital of the district of the same name, 35 miles west by south of Jassy, near the confluence of the Moldava and Sereth rivers (Map: Balkan Peninsula, F 1). The bishopric of Roman dates from the early fifth century. Population, in 1899, 14,019.

ROMAN, rō-mān', *Fr. pron.* rō'mäN', ANDRÉ BIENVENU (1795-1866). An American political leader. He was born in Opelousas Parish, La., and was the son of a French Creole sugar planter. He graduated at Saint Mary's College, Baltimore, in 1815, and soon afterwards settled on a sugar plantation in Saint James Parish, La. From 1831 to 1835 he was Governor of the State, and while holding that office he brought about the formation of a State agricultural society, the building of a penitentiary at Baton Rouge, the granting of $20,000 to Jefferson College, and other important public measures. He was again Governor from 1839 to 1843, and did much to prevent the repudiation of the State debt. In 1845, and again in 1852, he helped to draw up new State constitutions. In politics he was a Whig, and he was strongly opposed to secession, but as a delegate to the Convention of 1861 he acquiesced in the withdrawal of the State from the Union. Later in the same year he was one of the three commissioners sent to Washington by the Confederate provisional Government to negotiate peaceful separation. He was too infirm to take an active part in the conflict that followed, but was a strong supporter of the Confederacy.

ROMAN ART. Although the Romans affected to despise the practice of the arts and displayed little artistic taste in their earlier history, they developed, nevertheless, a distinctly national art under the late Republic and the Empire, largely by the hand of artists of Greek race, and produced in architecture types which have been in use for nearly twenty centuries. The history of Etruscan art dates from the period previous to the campaigns against the Greek cities, the conquest of which opened up the sphere of Greek art and ushered in the Hellenic period, which continued until the time of Augustus. It was during and after the reign of Augustus that the colossal undertakings of the Imperial period reached the unity of a national style throughout the Empire. The century and a half that followed was the golden age. The decay set in before the time of Septimius Severus and was complete in the time of Constantine except in point of practical constructive ability.

ARCHITECTURE.

PRE-ROMAN. Central and Southern Italy abound in ruins of elaborately fortified cities antedating B.C. 500, often more imposing and complete than the ruins of Mycenæ or Tiryns, e.g. Norba, Alatri, and Segni. The earliest temples (seventh century) remotely resembled the Greek in having a cella and portico, and in the use of a primitive and clumsy quasi-Doric order, the Tuscan; but they were built chiefly of wood, with terra-cotta ornaments, fragments of which have been found on many sites, as at Satricum, Alatri, and Falerii. In Tuscany and parts of Umbria peopled by the Etruscan race architecture and decoration were further advanced, though the temples were mainly of the type just described, with terra-cotta sculptures, even in Rome almost to the time of the Empire (Temple of Jupiter Capitolinus). Underground domes and vaults abound. Especially noticeable are the tombs at Tarquinii, Cære, Clusium (Chiusi), Perugia, and other sites, of elaborate design and sumptuous interior decoration, often representing the manners and customs of daily life. It is to the Etruscans that Roman architecture owes its arches and vaults.

ROMAN ARCHITECTURE. When, under the Republic, pure Greek influence became firmly established in Rome through the conquest of Southern Italy, Greece, and Asia, the Romans employed Greeks and their pupils to put up their first stone and marble temples of Tuscan, Doric, Ionic, and Corinthian orders in place of the earlier Etruscan temples of wood and terra-cotta. But wood continued in use for theatres, circuses, and amphitheatres almost until the Empire. The aqueducts that dotted the Roman Campagna were the most impressive of the works of Republican Rome. The old Tabularium on the Capitol, the only remaining civil building of the Republic, shows how the Romans had already learned to combine their native style of arcades with the Greek orders. In three stories of arched openings, each arch is flanked by engaged half-columns supporting an entablature at each story-level. This combination became classic and was followed throughout the Empire. The theatre of Marcellus, the Colosseum, the Basilica, and many other buildings were erected after this plan, using the Greek orders as a decorative adjunct to the Roman arched and vaulted constructions. The use of concrete (q.v.), which became general in the reign of Augustus, enabled architects to raise domes and vaults far larger than would have been possible with stone, and to produce a kind of architectural grandeur never dreamed of in earlier ages. Internal spaciousness and loftiness constituted a new artistic resource, which the world owes to the Romans.

The temples were no longer the paramount monuments. They were built on various plans, the most common having a high basement or podium and short cella with deep porch; they were often barrel-vaulted and without a peristyle, the flanks and rear being adorned with engaged columns (Maison Carrée at Nîmes; temples of Fortuna Virilis and of Faustina at Rome). Some were round (temple of Vesta, with encircling colonnade; Pantheon with rectangular porch). Later temples were of colossal size, like the double temple of Venus at Rome, and the temples at Baalbek and Palmyra. Upon

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these temples the Romans carried purely ornamental decoration to a far higher degree of magnificence than the Greeks, as in the temples of Baalbek, and those of Castor and of Faustina in Rome. They used the Corinthian and Composite in place of the plainer Doric and Ionic orders, and adorned the interiors of their basilicas, baths, and palaces with incrustations of marble and mosaics in a great variety of colors.

But although the Pantheon (q.v.) is one of the grandest structures extant, it was in their civic buildings that the Romans especially excelled; in their basilicas, vast halls, sometimes open, sometimes roofed or vaulted, for all sorts of public assemblies; in their fora, their miles of colonnades affording sheltered passage through the streets, and in their colossal public baths (e.g. of Caracalla or of Diocletian), which could accommodate many thousands of bathers, and whose courts, exedras, and halls—the latter of colossal size—were adorned internally in the most sumptuous manner with marble pavements and incrustations, mosaic, and delicate stucco relief in color. The Forum of Trajan, with its colossal memorial column, arch of triumph, basilica, and temple, was a stupendous aggregation of architectural splendor. The Roman triumphal arches (see ARCH, TRIUMPHAL) and columns have set the type for all subsequent works of this kind, and Roman sepulchral art was also remarkably successful, especially in tombs of moderate size. Monumental splendor, grandeur of scale, sumptuousness of decoration, the Romans achieved in architecture to a degree which has made their work the study and inspiration of later ages.

This Greco-Roman style spread rapidly over the whole Empire. In remote provinces the Roman army was employed in the erection of buildings and even entire cities, skilled designers being attached to each legion. New cities arose in Syria and Africa, with their amphitheatres, theatres, baths, and arches. The cities of Asia Minor were so thoroughly reconstructed that the remains of their earlier Greek architecture have disappeared under a mass of ruins of the Roman period, full of Hellenic spirit. Southern France became a great centre of Roman culture. The Pont du Gard, the amphitheatre and theatre at Arles, the arch and monument at Saint-Remy, the theatre at Orange, the gates, temple, baths, and amphitheatre at Nîmes, are impressive works of the golden age, and are better preserved than the monuments of Rome itself. In Spain and in Rhenish Germany are important remains, like the Alcántara bridge and the Porta Nigra at Treves.

In Italy itself, notwithstanding the wholesale destruction of the Renaissance, many works of first-class importance remain outside of Rome, too numerous to catalogue here. In Northern and Central Italy we may mention only the amphitheatre at Verona, the temple of Minerva at Assisi, the stupendous ruins of the Villa of Hadrian at Tivoli. The south of Italy, especially the region about Naples, has the most interesting monuments outside of Rome, such as the great amphitheatres at Capua, Puteoli, and Casinum (Cassino), the noble Arch of Trajan at Benevento, and finally the unrivaled ruins at Herculaneum and Pompeii. For both public and domestic Roman architecture of the best period, Pompeii is the great storehouse, because it presents a complete provincial city. See POMPEII.

In North Africa the French have unearthed a series of ruined Roman cities of great architectural interest. The cities of Thysdrus, Suffetula, Lambessa, and Timgad, nearly all built between about A.D. 130 and 250, abound in materials for study—basilicas, arches, temples, gates, fora, and tombs. The Roman remains in Syria may be divided into two classes: the reign of old Syro-Hellenic culture from the coast to the cities of Damascus, Antioch, and Edessa, and the inland region along the desert line, where the Romans were first to establish cities. (See PALMYRA.) It is the desert cities that have kept their ruins most intact—Petra, Palmyra, Baalbek (Heliopolis), Jerash (Gerasa), and many smaller towns. The colonnades and temples at Palmyra of late date are among the most colossal of Roman ruins. In Asia Minor the largest temple was that of Hadrian at Cyzicus; all the theatres (except that of Priene) are Roman, and that at Aspendus is the best preserved anywhere. Roman work is often interwoven with Greek, as at Pergamum, Magnesia, Aizani, Ephesus.

The buildings of Rome itself are too well known to require enumeration. Nearly all the types of temples are well represented. The theatre of Marcellus, the mausoleum of Hadrian, the Colosseum, the Roman Forum, and the later more formal and regular Forum of Trajan; the triumphal arches of Titus, Septimius Severus, and Constantine; the sculptured memorial columns of Trajan and Marcus Aurelius; scanty remains of basilicas, that of Maxentius being the most important; the Imperial palaces, on the Palatine; the Tabularium, the Senate House (S. Adriano), the Admiralty (Neptunium); the camp of the Prætorians; the Imperial baths of Titus, Trajan, Caracalla, and Diocletian; the unrivaled tombs of the Via Appia and the Via Latina are the most conspicuous examples of their several types. Constantinople was the field where the latest stage of Roman architecture was best displayed, while Rome itself was in decadence. Its memorial columns of Arcadius and Theodosius, its hippodrome, forum, basilicas, theatres, aqueducts, walls, were the greatest products of the fourth century, beginning with Constantine. Their inferiority in style as well as construction is marked.

Roman architecture remained by no means stationary during the four centuries of the Empire. In constructive skill, composition, and the union of sculpture with architecture there was almost continuous progress from Augustus to Trajan, when Roman art reached its perfection. Then began, with Hadrian, a decline in taste and in constructive refinement. But in bold, effective composition and daring construction there was, if anything, an advance: witness the baths of Diocletian and the basilica of Constantine. Reviewing Roman architecture as a whole, the world is more indebted to it than even to Greece for fertility and variety of invention. We have been ever since living on this technical and ideal inheritance.

SCULPTURE AND PAINTING.

The development of sculpture in Rome was relatively late. The chief incentive of Greek

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sculpture, the decoration of temples, was originally absent at Rome, and sculpture for a long time found its principal channel in portrait statues, required by the ancestor worship and self-glorification of Roman citizens. This tendency was fostered by the custom of keeping the images of ancestors in the houses and bearing them in funeral processions, and the practice early arose of erecting honorary statues to distinguished citizens. Mythological subjects were not much represented until the reign of Augustus, but here Greek originals were merely copied. At first bronze was the favorite material, and sculpture in the round the only form practiced, but with the advent of Greek influences marble became more common. The great architectural works of the Imperial period, the amphitheatres, baths, basilicas, bridges, etc., called for the decoration with innumerable statues. Specially Roman are those fine combinations of architecture, the triumphal arches, commemorative columns, and the like, in which the sculpture relief received a development which made it, next to portraiture, the most characteristic form of Roman art.

ETRUSCAN EPOCH. As in the architecture, the first influences in Roman sculpture and painting were Etruscan. (See ETRURIA, paragraph on *Archæology and Art.*) Recent discoveries under the *Lapis Niger* in the Roman Forum (1899-1900) show that as early as the sixth century B.C. statuary and other objects of art were imported from Etruria. There are hazy traditions also of Greek artists in Rome, as Damophilus and Gorgasus, who decorated the Temple of Ceres in B.C. 493, but until the end of the third century the chief influence remained Etruscan. The innumerable bronze statues with which the Forum was adorned were practically all of Etruscan origin.

THE GREEK EPOCH. The conquest of the Hellenic world, beginning with the capture of Tarentum in B.C. 275, opened the eyes of the Romans to the charm of Greek sculpture and painting, and Rome soon became a veritable museum of masterpieces torn from Greek temples and palaces. Every general brought back ship-loads of art works as a part of his booty. The decorations of the Temple of Honor and Virtue (B.C. 207) were carried off from Syracuse by Marcellus; those of the Temple of Fortune (B.C. 173) were seized from that of Juno Lacinia on a promontory between Crotona and Sybaris. Fulvius Nobilior built a temple to Hercules and the muses as a resting place for their statues captured in the Ætolian War, and when the rude Mummius took Corinth (B.C. 146), he gave his soldiers a free hand to sack the city of its art treasures. The crude Etruscan art was eclipsed and forgotten, but the Romans could only admire—not imitate—the Greek works that met them on every side. Greek artists of the later school flocked to Rome—Pasiteles, Stephanus, Menelaus, Arcesilaus—and their works found admirers as readily as those of Myron and Praxiteles. In fact, the popular taste called rather for the vigorous and the sensual than the ideal, and loved the Pergamene School, the 'Medici' Venus, and the Tortured Marsyas, which the *ateliers* of the day turned out in great numbers. The very large majority of ancient statues that fill our museums are works of this and the following periods.

GRECO-ROMAN EPOCH. The first two centuries of the Empire continued without limit the reproduction of Greek artistic types; but from the end of the Republic there grew up, almost unperceived, a new spirit, which may be called distinctively Roman, and which showed itself especially in realistic portraiture and in historical sculptured reliefs. The Greek conception of a portrait statue or bust was largely ideal, as in the Alexander-heads of Lysippus. Roman portraiture was a development of Etruscan art, and under the Republic was represented by the *imagines maiorum*, wax masks, which hung in the atria of noble houses. The "Young Augustus" and the armored statue of the same Emperor from Prima Porta represent Roman portraiture in its most perfect form, still influenced by Greek idealism. In the "Cæcilius Incundus" from Pompeii, and in the busts of Nero and Caracalla, we have the Roman realism, which never hesitated to reproduce personal peculiarities, however revolting. The realistic tendency shows itself also in reliefs—at first feebly, as in the noble sculptures from the "Ara Pacis" of Augustus; then more forcibly in the Arch of Titus and the columns of Trajan and Marcus Aurelius. Hadrian's travels in Greece and Egypt caused a momentary idealizing and archaizing reaction, shown in the noble melancholy of the Antinous busts and in the copies of old Egyptian motives. With the fall of the Antonine dynasty real creative art began to deteriorate.

The course of development in painting was similar to that of sculpture. It is impossible to say whether Gorgasos and Damophilos had any influence on contemporary painters. We indeed know from literature that temples were decorated with frescoes and that pictures of the victories of the Roman generals were borne in their triumphal processions; as, for example, of the siege of Carthage. Even the names of painters of Roman birth have been transmitted, the most celebrated being Fabius Pictor (c.300 B.C.), and the decorative painter Ludius (Tadius, Studius), a contemporary of Augustus. All were essentially Greek in technique and methods, as is evident from the few surviving works, which follow the forms of the Hellenistic period. Only mural decorations survive, but we know that panel painting was also largely practiced. The principal of these works is noticed in the appropriate place in the history of Greek painting (see PAINTING), but in many of the surviving examples there is a trend toward realism which can only be attributed to Roman influence. Such is the case with the famous "Aldobrandini Marriage," and in the delicate garden scenes, with birds and flowers, in Livia's villa *ad Gallinas;* while Pompeian frescoes show the same tendencies under Alexandrian influence.

THE DECLINE. There is little to be said of this period. Previous tendencies continued, but the technique suffered a gradual decadence which seems almost incredible. Colored marbles, and even materials most difficult to work, such as granite and porphyry, were used for sculptures, the hardship involved in the workmanship seeming to compensate for the crudity of the art. When Constantine built his arch, he did not hesitate to cover it with sculptures stripped from the earlier arch of Trajan—fine specimens of Roman realistic art which stand out in strong contrast with the later reliefs, puerile in conception and execution, that were set among them. A few examples of early Christian art are con-

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spicuous in this period of æsthetic decay, such as the charming "Good Shepherds" of the Lateran Museum. The same poverty of invention and decline of technique is evident in the paintings of the epoch, from which the Christian paintings of the Catacombs do not essentially differ. And with the barbarian conquest of Italy, all classical art comes to a sudden end. (See CHRISTIAN ART; BYZANTINE ART.) The Romans attained a considerable degree of excellence in certain of the minor arts, especially in objects of luxury. See JEWELRY; GEMS; RING; MANUSCRIPTS, ILLUMINATION OF.

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ROMAN CANDLE. See PYROTECHNY.

ROMAN CATHOLIC CHURCH. That portion of Christendom which is in communion with the Pope. Considering such adherence to a definite and visible centre of unity absolutely essential, it regards itself as the only legitimate Church of Christ in the world, the only inheritor by unbroken tradition of the commission and powers given by Him to His Apostles. By those outside its pale, widely differing views are taken of it, ranging from the 'Branch Theory' of High Church Anglicans (who hold that it constitutes with their own and the Eastern communions, though outwardly divided, one fundamentally integral Catholic Church), to the views of some extreme Protestants, who believe it to be an utterly corrupt organization which has, by its departures from primitive teaching and practice, almost forfeited the right to the Christian name. To the historical student, whatever his views, the study of its doctrines and acts, so intimately connected with the story of Western civilization, must always be of great interest. Numerous articles throughout the Encyclopædia give abundant details as to the doctrine and discipline of this Church, in its relation to the historic development of Christianity. Its organization will be found treated, for example, under BISHOP; ARCHBISHOP; CARDINAL; ORDERS, HOLY. Its sacramental teaching is given under SACRAMENT; MASS; TRANSUBSTANTIATION; and in the articles on each of the sacraments. Special doctrines, such as Infallibility, Immaculate Conception, Purgatory, come under their own titles; and the biographies of numerous popes and saints will throw much light on the progressive development of the Church's history throughout the centuries.

The article PAPACY has already traced, in as much detail as space would allow, the history of the Apostolic See of Rome down to the Council of Trent. The subsequent historical survey may best be divided into two periods. The first of these really begins before Trent, with the assembly by the Emperor Sigismund of the Council of Basel, which initiated a fresh attack on the Pope's authority, and may thus be taken to extend from 1431 to 1789, while the second reaches from the French Revolution to the present day. The first period thus embraces the break-up of the European family of nations, like-minded in religious belief, by the outburst of the Protestant revolt to counteract which the Council of Trent was assembled. It includes the extension of the faith to India, to Japan, and to the New World recently discovered, and ends with the great overthrow of the European comity of nations at the outbreak of the French Revolution. After the healing of the Great Schism (see SCHISM, WESTERN) the Church had to enter upon a contest if possible yet more momentous. She had passed out of the period of ancient and mediæval into the light of modern history, with modern appliances of printing, modern literature and art, improved connections, and fresh fields wherein to exercise her activity. Many things contributed to make the beginning of the sixteenth century a favorable time for a general assault upon her doctrine and discipline. On the one hand, the ranks of the clergy had hardly yet recovered from the distressing effects of the Black Death. Men's minds were still shaken by the seventy years' exile of the Papacy to Avignon and the succeeding schism. They were accustomed to the interference of princes with the bishops, and the curtailment of their liberty of intercourse with Rome. Lastly, all the countries of Europe were largely infected with teaching subversive of ecclesiastical authority, and were witnesses to the relaxation of discipline, neglect of the sacraments, deadness of religious life, and the luxury caused by the adoption (under the influence of the Renaissance) of heathen models among so many of the leading clergy and teachers. The details of the great revolt will be found under REFORMATION; while in the article COUNTER-REFORMATION some account will be found of the results which followed the vigorous putting into effect of the decrees of the Council of Trent. (See TRENT, COUNCIL OF.) Shortly before the time when the religious troubles in Germany caused the loss of so many members of the Catholic Church in Europe, the discoveries of the Portuguese in India and of the Spaniards in America had opened up

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fruitful missionary fields from which a host of new Christians were recruited. The work of the missionaries of the first half of the sixteenth century, typically represented at its sublimest in the lives of such men as Saint Francis Xavier and Bartolomé de las Casas, breathe the true apostolic spirit. After the missions the most important work of the Church during the sixteenth century was the revival of education. This, like much of the missionary work, was due mainly to the Jesuits, who established colleges in all the countries which remained untouched by the Reformation, and also in parts of Germany. Other teaching Orders, especially of women, took their rise or were revived in spirit at the end of this century, and for the next two hundred years practically monopolized such feminine education as there was.

New elements were of necessity introduced into the political relations of the Church after the Reformation. The final loss of England, Scotland, and Scandinavia; the consolidation of the non-Catholic powers; the mercantile predominance acquired by Holland, while the power of Venice and Genoa was waning; the colonial enterprise of Protestant England, at the expense of the interests of Spain and Portugal; the growth of a mighty empire in the East under the Czars, which was ultimately to involve the destruction of the Catholic Kingdom of Poland—all these causes tended to restrict the influence of the See which had a century earlier been acknowledged as the spiritual head of all Christendom. Austria and Spain assumed the rôle of defenders of the Catholic Church. France, after the crisis of the religious wars and the submission of Henry IV., became alternately the principal support of the Catholic cause and the greatest menace to the Pope's claims of jurisdiction. A succession of sagacious pontiffs were aided in their work by a large number of saintly individuals, whose lives drew men into the Church and confirmed the wavering—Saint Ignatius, Saint Francis Borgia, Duke of Gandía, Saint Charles Borromeo, Saint Francis de Sales, and others.

During the seventeenth century the same forces were at work within the Church. The number of students in Jesuit colleges increased before 1700 to nearly 200,000. Foreign missions prospered wonderfully in China (under Father Matthew Ricci, S.J.), India, and Japan. The Reductions of Paraguay offered a shining example of the successful organization of a Christian community among recent converts from heathen barbarism.

In Europe, however, the stubborn spirit of Jansenism (q.v.) for almost a hundred years threatened the peace of the Church. Though it was ultimately suppressed, it left its mark upon the Church of France in the spirit of Gallicanism, which implies nationalism in ecclesiastical organization and discipline, as opposed to the system of unification of all Christian peoples round the one centre. (See GALLICAN CHURCH.) At the same time in Central Europe the nations who had separated themselves from this unity were daily growing in material prosperity, and during the seventeenth and eighteenth centuries the Spanish and Portuguese missions in America, Africa, and Asia were in a great measure replaced by Dutch Calvinists and English Protestants. Prussia rose to be a great Protestant State by the side of Catholic Austria. The long minority of Louis XV. of France, under the regency of the infidel Duke of Orleans, opened the doors to the spread of a literature which, under the general name of the Encyclopædic School, treated the most vital doctrines of Christianity as open questions. The dissolute reign of that King and the immoral tone of his Court, which set the fashion for the rest of Europe, fomented a general discontent among the masses in France, which the relaxed discipline among the clergy was unable to counteract and which rapidly spread throughout the rest of the Continent. With the distinct object of eradicating Christian doctrines, the secret societies which had obtained increasing power in all the courts of Europe began by singling out for attack the Society of Jesus, in which they recognized the foremost champions of the liberties of the Holy See and of the old faith. The war, which began by the expulsion of the Jesuits from Portugal and Brazil by Pombal, was carried on by the Bourbon kings of France, Spain, and Naples, who brought such pressure to bear on Pope Clement XIV. as to force him in 1773 to decree the suppression of the Order. The removal of the most prominent exponents of religious education had a marked effect on the rising generation; and the attack on the other religious Orders, and eventually on the person of the Pope himself, could not be long delayed. The hostility to definite and dogmatic religious organizations which was shown in many quarters during the last half of the eighteenth century found expression especially in the hostile attitude of the Emperor Joseph II., and reached its culmination in the decrees of the French Revolutionary Assembly. Since then, even in nominally Catholic States, the action of European governments has generally been characterized by complete disregard of the traditional principles which had for many centuries influenced their conduct. Personal violence was offered to the Pope by Napoleon; and the nineteenth century was marked by the loss of the territory which had been subjected to Papal temporal jurisdiction, until in 1870 the last vestige of it, outside of the walls of the Vatican, disappeared.

Yet in spite of all these changes the inherent vitality of the Church has enabled it, in the concluding period, to gain in one direction what it lost in another. At the close of the eighteenth century, when Pius VI. died in captivity, those outside the Church spoke of the end of the Papacy. It was not until after the fall of Napoleon that Pius VII. was able to carry on his sacred duties in freedom. One of his acts was the restoration of the Jesuits, and, as before, they spread rapidly throughout the world, until again the principal Catholic schools came under their charge. In France the end of the first quarter of the century saw a reaction against the rationalism of the eighteenth, and, under the teachings of many zealous missionaries, the mass of the people returned to the faith of which many of them had grown up in practical ignorance.

In England the famous Oxford Movement (q.v.) called the attention of the English-speaking world to the Church's claims, and the removal of the legal disabilities under which her members had rested for three hundred years was the prelude to the restoration of an English hierarchy in 1850. Throughout the century there

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was a marked and progressive change of attitude on the part of English-speaking people toward the Church—a gradual disappearance of the bitter prejudices which had been entertained, and, thanks, in the first instance, to Sir Walter Scott's novels especially, a growth of sympathetic appreciation of the misunderstood centuries before the Reformation. In Germany the Catholic revival has been very marked, and the attempt at repression by the Prussian Government in the so-called May Laws (see KULTURKAMPF) brought about a political union of friends of the Church which gave them, under the name of the Centre Party, the balance of power and a prominent position before the world. While governments have frequently attempted a hostile or oppressive attitude, the work of the Church has continued to grow; especially where absolute religious freedom prevails, as in the English-speaking countries, its development has been most marked. Not only in England and the United States, but in Australia, Canada, India, and South Africa, the Church is becoming one of the most prominent factors in modern life. Side by side with the gradual drifting away of most non-Catholic religious bodies from their older dogmatic strictness has come an increasing appreciation of the value of an unchanged and an unchangeable definiteness of religious belief such as is furnished by the Roman Catholic Church.

While in many indifferent or purely administrative matters she has adapted herself to the changing conditions of modern life, in regard to the great fundamental verities the Church admits no possibility of change. Pius IX., for a time dethroned and driven into exile by the revolutionary forces which swept over Europe in 1848, only six years later defined as a dogma of the faith the belief of centuries in the immaculate conception of the Blessed Virgin Mary; in 1864 he promulgated a condemnation of what were considered, from the point of view of the Church, the false doctrines held throughout European society, in a document of no uncertain sound, the Syllabus of Errors (see SYLLABUS ERRORUM); and in 1869 convoked a general council to deliberate on matters of internal discipline. Hardly had the sessions begun when all predetermined matters of discussion were set aside to consider fully and eventually to define the doctrine of Papal infallibility. (See INFALLIBILITY; VATICAN, COUNCIL OF THE.) This doctrine, carefully limited as it is, crystallizes in practical form the belief in a living voice which shall speak with authority on what men need to know for the general guidance of their life here and hereafter. On the burning question of the inspiration of the Bible, the Roman Catholic Church, while always declaring the Scriptures to be in a special and particular sense the word of God, yet has never committed herself to any precise theory of the manner of inspiration, and is therefore able to meet without alarm the questions raised by the so-called higher criticism. A special commission was appointed by Leo XIII. in 1903 to promote advanced biblical studies, taking into account all the material provided by modern scientific criticism.

The hierarchy of the Church, with the Pope at its head, includes as his closest advisers the College of Cardinals (q.v.), seventy in number when its ranks are full. There are eight patriarchates of the Latin rite and six of the Oriental; these are nearly all practically titular dignities. There are 178 archbishops of the Latin rite and 19 of the Oriental. The Latin archbishops have 648 bishops in their provinces besides 84 who are immediately subject to the Holy See; and there are 52 bishops of the Oriental rite. These figures do not include over three hundred titular bishops (q.v.), who are employed as coadjutors or in missionary work. The practical administration in detail is largely carried on by the Roman congregations (q.v.), especially that of the Propaganda. (See MISSIONS.) It is obviously difficult to give any precise figures for the total number of adherents of this Church. The excellent authority, Mulhall, at the end of 1898, estimated the Catholic population of Europe at 148,900,000; of America at 44,100,000; of Asia and Africa at 6,600,000; and of Australia at 850,000—making a grand total of 200,450,000, or almost one-seventh of the total population of the world.

THE ROMAN CATHOLIC CHURCH IN THE UNITED STATES.

The continuous and authentic history of the Roman Catholic Church in the New World opens with the year 1494, when twelve priests accompanied Columbus on his second voyage. They were subject to the Spanish See of Seville until 1512, when the first American episcopal see of San Domingo was created. In 1522 another see was established at Santiago in Cuba, and the See of Mexico was added in 1530. From these latter sees were evangelized the Indians of the northeastern and southwestern territories of the present United States. The traces of their work may yet be studied in Florida, New Mexico, and California, where during the period from the middle of the sixteenth to the end of the eighteenth century Spanish missionaries, chiefly Franciscans, Dominicans, and Jesuits, established numerous Christian communities, dependent, however, on the authorities in Cuba and Mexico. In the same period French missionaries evangelized the savages of the Saint Lawrence, Maine, northern New York, and the Mississippi. As early as 1634 Jesuit fathers were established in the originally Roman Catholic colony of Maryland, and after 1681 Roman Catholics were tolerated by Penn and the Quakers in their colony of Pennsylvania. From these latter centres derive the actual Roman Catholics of the United States. Until 1784 they were under the spiritual jurisdiction of the Vicar Apostolic of London, and their religious needs were ministered to by such rare missionaries as could be induced to cross the ocean.

The Revolution brought a change for the better. Religious and civil liberty, the civil disorders of Europe, the economical reverses of the Old World, the attractiveness of a new and untrammeled society, set in movement a huge immigration, of which a great percentage was Roman Catholic, mostly from Ireland. In 1790 the See of Baltimore was created, and John Carroll, a near relative of the signer of the Declaration of Independence, was made its first bishop. There were then about 30,000 Catholics in the thirteen colonies, more than one-half being in Maryland, and some 7000 in Pennsylvania. By the year 1820 the Catholics had reached the figure of a quarter of a million, and in 1840 their number was calculated at about 1,000,000. The increase of immigration trebled that number in

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the next two decades, and in 1870 they were nearly 5,000,000.

The external history of Roman Catholicism in the United States during the nineteenth century is not marked by any notable events, if we except some outbreaks of intolerance. It has been the history of a voluntary religious association growing at first by accessions from without and then by its own birth rate. Its internal activity has been marked by the growth of its diocesan system and its clergy, diocesan and religious; by the building of churches and chapels, the erection of parochial schools, colleges, academies, and a university; by the provision for its own poor and destitute and helpless; by an apologetic literature of newspapers, reviews, and books. The Roman Catholic Church in the United States has had to face problems quite different from those that await her in Europe or the Orient. Her numbers are made up of many nationalities, chiefly European, that differ in racial temper and proclivities, intellectual culture, hereditary tendencies, and political past. Her chief domestic concern is the amalgamation of these various elements and the gradual formation of a homogeneous type, a task that is daily progressing to completion. In 1900 quasi-official figures placed the total Catholic population at 10,129,677. But absolutely reliable figures are not attainable, for a variety of reasons. It is probable that the number is not far from 14,000,000, if we accept the decadal ratio of growth, as established by the Catholic historian John Gilmary Shea. This population is very unevenly distributed, by far the greater part of it being found in the larger cities and industrial centres, though a rapidly increasing percentage is of native origin. From 1850 to 1900, about 4,000,000 people, nearly all Roman Catholics, emigrated from Ireland, the greater part of them to the United States. This great wave of immigration has long since fallen off; there came from Ireland in 1900 only 35,370. On the other hand, the immigration from Italy has steadily increased from 21,295 in 1886 to 100,135 in 1900, while again that from Germany has shrunk to small proportions. In about the same period, however, the immigration from Austria-Hungary, which is mainly Roman Catholic, rose from 56,199 in 1890 to 114,847 in 1900. The membership of the Roman Catholic Church is, therefore, even yet notably affected by the rise and fall of the tide of European immigration. Among the more famous leaders of Roman Catholicism in the United States we may count Archbishop John Carroll, of Baltimore, who was sent by Congress to Canada in 1776, with Benjamin Franklin, Samuel Chase, and Charles Carroll, of Carrollton, in order to induce the Canadian Catholics to join the Revolutionary forces; Bishop Cheverus, of Boston, afterwards Cardinal Archbishop of Bordeaux; Bishop England, of Charleston; Archbishop Hughes, of New York, sent by President Lincoln as an envoy to France and Spain during the Civil War; Archbishop Spalding, of Baltimore. The principal events of general interest within the last two decades are the Plenary Council of Baltimore (1884), the Catholic Congress (1889), the foundation of the Catholic University at Washington (1889), and the establishment of the Apostolic Delegation at Washington (1893).

ADMINISTRATION. The Roman Catholic Church in the United States is part of the organic whole of Catholicism, and as such is subject to the same central legislative and executive authority as all other national churches—the Bishop of Rome. He exercises therein a jurisdiction that is recognized as of divine origin, immediate, apostolic, and ordinary. This holds good not only in matters of doctrine, but also in matters of discipline; the Pope is the final court of appeal in all matters of a spiritual or religious character. In detail, the Papal authority is partly written, partly of daily application—interpretative, executive, legislative. The basis of government is the Canon Law (q.v.), as considerably modified by the Council of Trent, and since then by the numerous decisions and interpretations of Roman congregations, as well as by Papal rescripts, and the special legislation for missionary countries and circumstances. Nevertheless, there remains much in this code of laws, in the shape of principles and spirit, which is unchanged and unchangeable, and therefore common to the Roman Catholic Church in the United States with all other parts of Catholicism.

The Church in the United States is divided into provinces and dioceses. Each province is presided over by an archbishop. Each diocesan bishop, however, is quite independent within his own territory. The archbishop presides over provincial synods, at meetings of his suffragan bishops, and exercises, in some well-defined cases, a certain authority of supervision. Each diocese, moreover, is provided with a chancery and the requisite officials to carry on the canonical government of the faithful. The dioceses are divided into parishes and missions, whose pastors are appointed by the bishop. The bishop is provided with a council of priests, partly of his own selection, partly chosen by the diocesan clergy. This council, however, though it represents the cathedral chapter, has only a consultative character; its consent is not requisite to the validity of episcopal acts. It is the right and duty of the bishop to visit canonically all parishes and missions, see to the observance of the canons and other ecclesiastical legislations, and execute his own or superior judicial decisions. Where the bishop does not proceed by his own authority, as in many details that concern religious Orders, he acts, since the Council of Trent, as delegate of the Holy See. Within his diocese the creation, division, and reunion of parishes; the site, style, and cost of all churches; the contracting of debts for parochial purposes; the building and conducting of schools, convents, academies; the life and works of the clergy, diocesan and religious, and of the communities of women, are subject to the bishop.

Since the third Plenary Council of Baltimore, the nomination of episcopal candidates belongs to certain of the clergy of the diocese, under the supervision of the archbishop, and eventually of the bishops of the province. The diocesan consultors and the 'irremovable' rectors of parishes in the vacant diocese select three names that are ticketed as 'most worthy,' 'very worthy,' and 'worthy' of the office (*dignissimus, dignior, dignus*). These names are sent to the Prefect of the Propaganda after a meeting of the archbishop and his suffragans, in which said names are either approved or rejected, in whole or in part. Reason for the latter action must be submitted to the Roman authorities, with whom lies

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the final choice. The delay, except in extraordinary circumstances, is usually from three to six months, during which time an administrator is appointed by the archbishop of the province.

The bishop must appoint a vicar-general, whose authority is ordinary, i.e. not dependent on restriction of the bishop, but specified in the canon law and ecclesiastical legislation. This official represents to the clergy the episcopal authority and has certain well-defined duties, rights, and attributes that go with the office and cease when he no longer holds it. Other officials, provided for partly in the canon law, partly by the legislation of national councils, hold their appointment from the bishop. Such are the clergymen to whom are assigned the official defense of marriages whose annulment is sought on canonical grounds, the prosecution of offenders against the Church laws, the examination of candidates for admission to the diocese, the visitation of parochial schools. Of the 'consultors' of the bishop, one-half are named by himself, the other half are elected by all the diocesan clergy. This council must be renominated every three years. The time and place of its meetings and the subjects of its deliberations depend on the bishop, who is not bound canonically to accept its opinions, though he is held to create it and to consult with it.

LEGISLATION. The particular legislation that emanates from the Roman Catholic episcopate of the United States as a whole arises from three sources—the national, provincial, and diocesan councils. The latter are now usually called synods, though the terms are interchangeable. There have been three national (plenary) councils—all held at Baltimore, which see, by reason of its being the first in order of time, has a quasi-primatial character accorded to it by the Holy See. These three national councils were held in 1829, 1866, and 1884. After approval by the Pope, the decisions are made public, and become the highest national ecclesiastical law and norm of administration. The effective membership of a national council is restricted to the bishops—certain ecclesiastical personages have an honorary right of assistance, but not of vote. Provincial councils are called at indefinite periods by the archbishop of each province, and the membership is confined to the suffragans of the same. The diocesan synod is called by the bishop of the diocese, and is attended by the priests of the same. It presupposes all legislation that emanates from higher sources, both general and national, and legislates for local needs.

STATISTICS. With the exception of the population figures, the statistics of the Roman Catholic Church in the United States are quite accurate. They are collected annually by the diocesan authorities, usually through the chancellor or vicar-general of the diocese, and are furnished to two directories or almanacs, Sadlier's (New York) and Hoffman's (Milwaukee); now also to the Census Bureau, which includes them in its report. In 1900 the Roman Catholic hierarchy of the United States included one cardinal, 14 archbishops, and 77 bishops. The clergy numbered 11,636, of which total 8660 were members of the different dioceses and 2976 belonged to religious Orders. There were, in all, 12,062 places of public worship. Of these 6409 are classed as parish churches, 3930 as missionary churches, and 1723 as chapels. The reason of the distinction lies partly in the fact that all the parish churches have resident priests, partly in the frequency of use, size, and accessibility of the mission churches and chapels. The education of the clergy was provided for in 30 diocesan seminaries, with 2630 students. The religious Orders had 79 novitiates with 1998 students or candidates. The educational institutes were one pontifical university (Washington), 170 colleges for boys, and 662 academies and convents for girls. There were 3811 parochial schools, with an attendance of 854,523. The charitable institutions were 827 in number, exclusive of 251 orphan asylums that sheltered 35,243 children of both sexes. The Catholic population was estimated at the low figure of 10,129,677. The Catholic Indians numbered about 90,000; 113 priests worked among them, and served 183 churches or chapels. There were 73 Catholic schools, with 24 teaching sisterhoods and 5000 pupils of both sexes. The colored Catholic population was estimated at about 140,000. There labored among them 48 white priests, with the charge of 40 churches. The colored Catholic schools were 81 in number, cared for by 24 sisterhoods, with an attendance of 6401 children of both sexes.

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ROMAN CATHOLIC EMANCIPATION. After the Reformation, both in England and in Scotland, Roman Catholics were subjected to many penal regulations and restrictions. As late as 1780 the law of England made it felony in a foreign Roman Catholic priest and high treason in one who was a native of the kingdom to teach the doctrines or perform divine service according

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to the rites of his Church. Roman Catholics were debarred from acquiring land by purchase. Persons educated abroad in the Roman Catholic faith were declared incapable of succeeding to real property, and their estates were forfeited to the next Protestant heir. A son or other nearest relative, being a Protestant, was empowered to take possession of the estate of his Roman Catholic father or other kinsman during his life. A Roman Catholic was disqualified from undertaking the guardianship even of Roman Catholic children. Roman Catholics were excluded from the legal profession, and it was presumed that a Protestant lawyer who married a Roman Catholic had adopted the faith of his wife. It was a capital offense for a Roman Catholic priest to celebrate a marriage between a Protestant and a Roman Catholic. In 1780 Sir George Saville introduced a bill for the repeal of some of the most severe disqualifications in the case of such Roman Catholics as would submit to a proposed test, which included an oath of allegiance to the sovereign, and abjuration of the Pretender, a declaration of disbelief in the several doctrines—that it is lawful to put individuals to death on pretense of their being heretics; that no faith is to be kept with heretics; that princes excommunicated may be deposed or put to death; and that the Pope is entitled to any temporal jurisdiction within the realm. The bill, from the operation of which Scotland was exempted, eventually passed into law. In 1791 a bill was passed affording further relief to such Roman Catholics as would sign a protest against the temporal power of the Pope and his authority to release from civil obligations; and in the following year the most severely penal of the restrictions bearing on the Scottish Roman Catholics were removed without opposition.

Endeavors were made at the same time by the Irish Parliament to place Ireland on an equality in point of religious freedom with England. The agitation culminated in the Irish Rebellion of 1798; the union of 1801 followed, which was partly carried by means of pledges, not redeemed, regarding the removal of the disabilities in question. Meantime in England Roman Catholics continued subject to many minor disabilities, which the above-mentioned acts failed to remove. In the early part of the nineteenth century many measures were proposed for the removal of these disqualifications, and the agitation on the subject among the Roman Catholics themselves greatly increased, in 1824 assuming an organized shape by the formation of the 'Roman Catholic Association' in Ireland. The Duke of Wellington, who for a long time felt great repugnance to admit the Roman Catholic claims, was at last brought to the conviction that the security of the Empire would be imperiled by further resisting them, and in 1829 a measure was introduced by the Duke's Ministry for Catholic emancipation. The celebrated Roman Catholic Relief Bill was passed the same year. By this act an oath is substituted for the oaths of allegiance, supremacy, and abjuration, on taking which Roman Catholics may sit or vote in either House of Parliament, and be admitted to most other offices from which they were before excluded. They, however, continue to be excluded from the offices of guardian and justice or regent of the United Kingdom, Lord Chancellor, Lord Keeper, or Lord Commissioner of the Great Seal of Great Britain or Ireland, and Lord High Commissioner to the General Assembly of the Church of Scotland.

ROMANCE (OF. *romans, romanz, roumans, roman, romant, roumant, romance*, from ML. *Romanice*, in Roman or Latin fashion, from Lat. *Romanicus*, from *Romanus*, Roman, from *Roma*, Rome). Originally, anything written in one of the Romance languages; in the fifteenth and sixteenth centuries, a story in prose dealing with the adventures of knights. From the French, which had taken it from the Spanish, the word romance came into English. The essentials of romance are a passion for the adventurous, the strange, and the marvelous, and a tendency to exaggerate the virtues and vices of human nature. European romance, in the larger application of the term, dates from the Greeks. It was a development from the epic. The *Iliad*, representing men and incidents as they were believed to be at the time of its composition, is an epic with only few romantic episodes. But the *Odyssey*, depicting an imaginary voyage employed as the framework for a series of marvelous folk-tales, is essentially a romance. This love of romance, so manifest among the earlier Greeks, reached its climax in the first centuries of the Christian era. In the article NOVEL is given a brief account of the fictions then current, in which the sophists tried to outdo one another in imagining adventures that could not possibly happen in real life. But the same age produced the beautiful *Cupid and Psyche* of Apuleius (who, though he wrote in Latin, was Greek in spirit), and the *Hero and Leander* of Musæus, which has charmed a succession of English poets from Marlowe to Byron. The Greek stories began to find their way into Western Europe as early as the twelfth century. Indeed, *Apollonius of Tyre* was translated into Anglo-Saxon from a Latin epitome of the original Greek; and after various renderings, it was turned into a drama by Shakespeare in his *Pericles, Prince of Tyre*. One Greek motive, that of the hero or heroine in disguise to be followed by a beautiful recognition scene, became a favorite with the romancers of Western Europe, from whom it passed into the choicest comedies of Shakespeare. Other familiar motives of modern romance, as 'the exile and return,' 'the assumed death,' and 'the test of chastity,' seem also to have been derived from the Greeks.

The mediæval verse romance was an offshoot of those epic narratives called *chansons de geste*, celebrating the victories of Charlemagne and other great leaders, usually over the Saracens. When the incidents which first gave occasion to the epic recital receded into the distant past, marvel was added to marvel. And when in the twelfth century the French trouvères assigned love as the prime motive for the adventures of the knight, the epic was transformed into the romance. From their original home in France, the romances were diffused over Western and Northern Europe. Made for men and women of rank, often for the Court, they were not recited, as were the earlier *chansons de geste*, by minstrels; they were rather designed to be read aloud in groups of lords and ladies, or, like the modern novel, to be read in private. The mediæval romances gathered in cycles round great events and favorite heroes, as the siege of Troy, Charlemagne, and King Arthur. The Troy legend, derived from Latin sources, was treated in France

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by Benoit de Sainte-More in his *Roman de Troie* (late twelfth century), from which the great story of Troilus and Cresseide (Cressida) was afterwards taken up by Boccaccio in Italy and by Chaucer in England, receiving dramatic form from Shakespeare. The legend of Charlemagne, telling of the destruction of the Emperor's rear guard by the Saracens in the passes of the Pyrenees, is extant in two principal forms: the *Chanson de Roland* (close of eleventh century) and the Latin romance of the pseudo-Turpin (about 1125). Later romancing on Charlemagne led to the legends known in their English dress as *The Sowdone of Babylone; Otuel; Sir Firumbras;* and the prose *Huon of Bordeaux*, which first make known to England Oberon, the king of the fairies in Shakespeare's *Midsummer Night's Dream*. Beautiful as many others may be, the mediæval romances that appeal most strongly to the English race are those celebrating the deeds of King Arthur and the knights of the round table, on which the French and Anglo-Norman poets built up a vast romantic structure in harmony with the ideals of chivalry. Reduced to prose, Arthurian romance was handed over to later times by Sir Thomas Malory in his *Morte d'Arthur* (1485). These cycles which have been described are only sections of an immense body of romance current in the Middle Ages. Other heroes were Alexander, King Richard Lion-Heart, King Horn, Havelok the Dane, Guy of Warwick, and Sir Bevis of Hamtoun.

The later romances in prose are more definitely connected with the history of the novel, under which head they are noticed. We may cite *Amadis de Gaula*, the flower of Spanish romance, Sir Philip Sidney's *Arcadia*, the historical romances of Sir Walter Scott, and the revival of adventure in Robert Louis Stevenson and his numerous followers. The legends of King Arthur have been adapted to the nineteenth century by Tennyson, Swinburne, and others; and a group of tales, Greek and mediæval, have been delightfully retold by William Morris in *The Earthly Paradise*.

See the articles on the Grail and on the romantic heroes: Arthur, Gawain, Guinevere, Guy of Warwick, Lancelot, Merlin, Perceval, and Tristram. For the relation of romance to the novel, see NOVEL. The revival of romance is discussed under the head ROMANTICISM. Consult also: Saintsbury, *The Flourishing of Romance* (London, 1897); Ker, *Epic and Romance* (ib., 1897); Billings, *A Guide to the Middle English Romances* (New York, 1901); Körting, *Grundriss der Geschichte der englischen Litteratur* (Münster, 1899); and Gaston Paris, *La littérature française au moyen-âge* (Paris, 1890).

ROMANCE. In music, a vocal composition in epic-lyrical style resembling in form the ballad. But while in the ballad Nature, or some natural power personified, constitutes the theme, the romance draws its subjects from stories of knightly adventure. In recent times the term romance has also been applied to purely instrumental compositions of a romantic character the form of which is as elastic and indefinite as that of the instrumental ballad. The term originally meant nothing more than a narrative in Romance (Provençal) verse as distinguished from Latin verse (twelfth and thirteenth centuries). In France a romance is merely a sentimental love-song.

ROMANCE LANGUAGES. The languages sprung from Latin and bearing its impress strongly in vocabulary and grammar. In a rough way, the Romance territory in Europe corresponds to what belonged to the ancient Roman Empire. It is bounded approximately by the English Channel, the Atlantic Ocean, the Mediterranean Sea, the Adriatic, and a line drawn through Belgium from Gravelines to Eupen, and then from Eupen to the Alps and the Adriatic. In the East, isolated from the rest, is Rumania. Colonists have also carried these forms of speech to other continents, and they are spoken in Canada, Mexico, Central and South America, and in various settlements in Africa and Asia. It is usual to speak of seven or eight Romance languages, though the division is more a matter of convenience than of scientific accuracy. These are Rumanian, Romansh (Rhetian, Ladin), Italian, French, Provençal, Spanish, and Portuguese, to which is added, according to the views of the individual scholar, Catalan or Franco-Provençal or Sardinian.

Though contemporary references show the existence of the *lingua romana* in the seventh century, nothing was at that time written in this form of speech. Every one who could write at all wrote, or attempted to write, in Latin. The earliest known monument in any Romance language is the Strassburg Oaths, sworn in A.D. 842 by the armies of Louis the German and Charles the Bald, and preserved in the Latin history of Nithard. These oaths consist of a little more than 100 words in French. To the end of the ninth century belongs the *Sainte Eulalie*, a short poem, also in French. There are a few other documents belonging to the tenth century, but extended literary works are not found before the eleventh. To this same time belong the earliest writings in Provençal, while, with the exception of a few formulas, there is nothing in Spanish earlier than the twelfth, nor in Italian earlier than the thirteenth century.

Between the classical Latin, therefore, and the earliest written specimens of the Romance languages, there is a great gap, which philologists attempt to bridge as well as they may by reconstructing the forms of popular or late spoken Latin. The materials available for this task are inscriptions, dialogue in the old comedies, errors reprehended by Roman grammarians, specimens of early mediæval Latin, documents written by ignorant scribes, and, above all, the features of the Romance tongues themselves. However wide the gap which exists between the written documents in the two forms of speech, there is nevertheless not the least break in the continuity of the development from spoken Latin to the various modern Romance languages.

The Romanization of the West, so thoroughly accomplished, went on actively for about four centuries, though it is quite impossible to fix accurate dates for a process of this kind. Beginning in Italy itself with the subjection of non-Latin neighbors, it spread to Sicily in the third century B.C., a century later to the Mediterranean coast of Gaul and Spain, and to Gaul proper only after the beginning of the Christian Era. During this period the Latin language itself naturally underwent changes, and

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the later colonists carried with them a speech differing somewhat from that of their forerunners. It must not be supposed, however, that this spoken language was precisely the same as that written by the masters of classic literature. Each grade of society, each part of the country, must have had its own linguistic peculiarities. Yet there seems to have been throughout the Roman dominions a remarkable uniformity both of grammatical forms and of vocabulary, political unity tending to break down dialect variation. On the other hand, the pronunciation doubtless varied largely, according to the native races who learned the tongue of their conquerors, much as English differs in the mouths of the various inhabitants of the British dominions in Asia, Africa, and America.

Throughout the vast Roman Empire, then, besides the Latin of written books and formal speech, unchangeably fixed for later generations in the classic masterpieces, there existed a more careless diction of every-day life, used by the uncultured. It is frequently referred to as *sermo cottidianus*, *proletarius*, *rusticus*, *vulgaris*, or *militaris*. Although much uncertainty prevails in regard to the relations between this language of the vulgar and that of literature, we may be sure that it was subject to comparatively rapid phonetic and grammatical change and that its vocabulary admitted words upon which the purist frowned. In the course of time the quantity and quality of the vowels were altered. Short vowels became open, while long ones were closed. Then short vowels in free syllables were lengthened, long checked vowels shortened. Certain unstressed vowels disappeared and some final consonants, notably *m*, were dropped. Voiceless consonants between vowels became voiced, and then were lost, while in other positions different consonants underwent a variety of transformations. From the conjugation of verbs the future and the passive are lost. The cases of nouns fall together, and relations are largely expressed by prepositions. Vulgar words are often preferred to the more refined, as *caballus*, 'nag,' instead of *equus*, 'horse;' strong words to the more usual, as *manducare*, 'to chew, to devour,' instead of *edere*, 'to eat;' sometimes new forms merely replace the old, as *amicitas* for *amicitia*.

This vulgar or popular Latin was, as has been said, comparatively uniform throughout the Roman Empire, though some differences must be assumed, due partly to the different epochs at which the provinces were Romanized and partly to the character of the races inhabiting those provinces. Yet, on the whole, the indigenous tongues seem to have left upon the development of the *lingua romana* but faint traces of their influence. They doubtless had their effect in modifying pronunciation, though there is but little certain knowledge on this subject, and they also contributed a few words to the vocabulary. It is remarkable, however, how little can be traced even to so important a race as the Celts. In all the most significant linguistic elements, the Romance languages are nothing but Latin following a normal evolution in an unbroken tradition.

The Teutonic invasions, though they destroyed the unity of the Roman Empire, did not, in those countries in which Latin was firmly established, interrupt its linguistic development. By isolating the different communities, however, and through the substitution of a number of independent States in place of a centralized government, thus cutting off free intercourse with Rome, they doubtless gave an impetus to the separation of the various dialects. Moreover, they had some influence upon the pronunciation and contributed considerably to the vocabulary, particularly terms connected with war. Even before the barbarian conquest a number of such terms had been in use among the Romans, owing probably to the presence of German troops in the Imperial armies, but the later additions are much more important and copious. In fact, no other external influence upon the Romance languages can compare in weight and value with that of the German.

The loss of the sentiment of nationality led, in the sixth and seventh centuries, to the rise of the Romance nations and of the Romance languages. It was recognized that those speaking the *lingua romana* could not understand Latin, nor could one using Latin understand the various forms of the *lingua romana*. Moreover, French was seen to be different from Provençal, and Provençal from Italian and Spanish. In each country, indeed, a literature was developed in the vulgar tongue. At first every author wrote in his native dialect, but soon political and literary centres began to exercise a powerful influence, and the dialect of Paris or Florence or Castile came to be the official and correct language, while the other dialects sank more and more into the mere patois of the uneducated peasant.

During all this development the literary Latin, the language of the Church and of learning, more or less rigidly written according to unchanging rules and models, never ceased to affect the popular tongue. Borrowing went on without interruption, giving rise to learned terms which often exist side by side with popular terms developed from the same Latin word. These learned terms can be distinguished by their closer resemblance to the original, since they have not passed through the natural phonetic development. We have, for example, from the Latin *causam*, in French the doublets *chose* and *cause*, and in Italian *cosa* and *causa*. In borrowing from other sources than Latin, German has given most to French, and Arabic to Spanish, but every modern language contributes to the vocabulary of its neighbors.

The evolution of the Latin into the Romance languages can best be studied in the concrete case of one particular tongue such as French, Italian, or Spanish, but a few general remarks, by no means exhaustive, may be made. The Latin accent or stress usually remains on the syllable on which it was originally. Changes in the vowels are conditioned by the stress, by the fact of their being free or checked, by the influence of preceding and following sounds, both vowel and consonant, and by position, either initial or final, before or after accent. The changes in consonants are conditioned chiefly by their position, initial, intervocalic, or final, and by their combination with other consonants. In the Romance tongues the inflection of substantives has almost wholly disappeared, and there is but one case, usually derived from the Latin accusative; the plural, at least in the written form, is distinguished from the singular; the neuter gender no longer exists. The personal pronouns have three or four cases, and both stressed and unstressed

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forms. The definite article has been developed out of the Latin *ille* and the indefinite article out of *unus*. The verbs commonly make a new future with *habeo* and the infinitive, as *cantare* + *habeo*, giving Italian *canterò*, Spanish *cantaré*, French *chanterai*, 'I have to sing, I shall sing.' The new passive is made by joining a past participle to some form of *esse*, 'to be,' or the active voice of the verb with a reflexive pronoun. New perfect tenses have also been made with the perfct participle preceded by *habeo* or *sum*. A considerable array of suffixes has been developed with which new words can be built from various material.

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ROMANCE LITERATURES. The literatures of the various Romance languages, especially French, Provençal, Italian, Spanish, Portuguese, and Rumanian. See ROMANCE LANGUAGES; FRENCH LITERATURE; ITALIAN LITERATURE; PORTUGUESE LITERATURE; PROVENÇAL LITERATURE; RUMANIAN LANGUAGE AND LITERATURE; SPANISH LITERATURE.

ROMAN DE LA ROSE, rô'mäN' de lä rôz (Fr., Romance of the Rose). A famous French poetico-satirical allegory of the thirteenth century. The work, which is in octosyllabic verse, and which is over 23,000 lines long, consists of two distinct parts, the first of which, in 4670 verses, was composed by Guillaume de Lorris (q.v.) about 1230. It is related as a 'dream,' and celebrates the trials and triumphs of love. The author, called Loving (Amant), in early spring enters a beautiful garden where there is a rosebud which he feels impelled to pick. The god of love, who has followed him thither, pierces him with three arrows, each of which increases his desire. After various adventures, he obtains from Welcome (*Bel-accueil*) the permission to kiss the rose, but Jealousy comes up, surrounds the rose with a wall, and locks up Welcome in a tower. Loving, deprived of the sight of the rose, is overcome with sorrow. Though commonplace in itself, this story is embellished by a great number of poetic details and by the most graceful and vivid descriptions. The style, too, is picturesque and refined. For some unknown reason (some say the death of Guillaume), the poem was interrupted here, and only after forty years was taken up and completed in almost 20,000 verses by Jean de Meung (q.v.). The latter, of a very original and radical turn of mind, has been called the Voltaire of his age. He conceived the singular notion of supplanting Guillaume's *ars amatoria* by an elaborate treatise on the scientific and political questions of his age. Loving is accosted by Reason, who in a long argument endeavors to make him leave the service of Love. But at this point Friendship steps in and urges him to besiege the tower. Love also promises his aid and assembles all his forces. The action is here retarded by a long interview of Nature with her chaplain Genius. Finally the tower falls and Welcome, set free, allows Loving to pick the rose.

The main interest of the second part lies, of course, in the expression of the author's individuality. This reveals an amount of learning and perspicacity unusual for that time. Jean denies the divine right of kings and proclaims the sovereignty of the people. He condemns the celibacy of the clergy as immoral because unnatural; he expresses his disbelief in ghosts and sorcerers, and in the influence of comets over human lives. His work is also notable from a literary point of view; though prolix and often trifling, it abounds in vigorous descriptions, realistic portraiture, and eloquent invective.

The immediate influence of the *Roman de la Rose* surpassed that of any other mediæval work. It is extant in more than 200 manuscripts, and a later remodeling by Marot was almost more popular than the original. It gave the impulse to the rise of allegory in other countries. Translations into foreign tongues appeared toward the end of the thirteenth century. Henry von Ahern put it into Flemish, Durante—a contemporary of Dante—into Italian sonnets, and Chaucer into English verse. Unhappily for English literature, Chaucer's translation is lost.

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ROMAN DE LA VIOLETTE, de lä vê'ô'lĕt' (Fr., Romance of the Violet). A French poem of the thirteenth century in about 6700 rhymed eight-syllabled verses, by Gerbert de Montreuil. It tells of a woman whose virtue is the subject of a wager. She is slandered, but succeeds at last in proving her innocence. This Greek tale is the basis of the *Roman du Comte de Poitiers*, of *Floire et Jeanne*, the miracle of *Ot et Bérangier*, of the ninth story of the second day in the *Decameron*, and of Shakespeare's *Cymbeline*. Weber's opera *Eurianthe* (1823) has the same story for its dramatic theme. The *Roman de la Violette* was published by F. Michel (Paris, 1834). Consult the *Histoire littéraire de la France*, vol. xviii. (ib., 1835).

ROMAN EMPIRE, HOLY. See HOLY ROMAN EMPIRE.

ROMANES, rô-mā'nĕs, GEORGE JOHN (1848-94). An English biologist and psychologist, born

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at Kingston, Canada. He was educated in England, France, Germany, and Italy, graduating from Gonville and Caius College, Cambridge, in 1870, with honors in natural science. In 1875 and again in 1881 he was Croonian lecturer to the Royal Society, to which he was elected to membership in 1879. Later he became Fullerian professor of physiology in the Royal Institution of London and Rosebery lecturer on natural history in the University of Edinburgh. He also served the Linnæan Society as its zoölogical secretary. Besides publishing a series of monographs on the Medusæ, Echinoderms, etc., he devoted himself to extending the principles of evolution in the field of psychology, having become an intimate friend of Charles Darwin while in Cambridge. His chief works are: *A Candid Examination of Theism* (1878); *Animal Intelligence* ("International Scientific Series," xliv., 1881); *Charles Darwin: His Life and Character* (1882); *The Scientific Evidence of Organic Evolution* (1882); *Mental Evolution in Animals, with a Posthumous Essay on Instinct by Charles Darwin* (1883); *Jelly-fish, Star-fish, and Sea Urchins* ("International Scientific Series," xlix., 1885); *Mental Evolution in Man: Origin of Human Faculty* (1888); *Darwin and After Darwin: An Exposition of the Darwinian Theory and a Discussion of Post-Darwinian Questions* (1892-97); *An Examination of Weismannism* (1893); *Thoughts on Religion* (1895); *Mind and Motion and Monism* (1896). Consult *The Life and Letters of George John Romanes, written and Edited by His Wife* (London, 1898).

ROMANESQUE ART (Fr. *romanesque*, from Sp. *romanesco*, from ML. *Romanisous*, Roman, from Lat. *Romanus*, Roman, from *Roma*, Rome). A general name for the art that flourished in Europe during the period of fermentation before the definite constitution of nationalities, from about A.D. 800 to 1200. In general it is remarkable only for its architecture, which overshadows all other branches. Sculpture and painting revive, but are still in their infancy; goldsmith work, illumination, and ivory-carving are practiced with better success. Except in Italy, the art of this period is chiefly monastic. The great free cities in Italy and the Imperial and feudal houses of Germany were the only great stimuli to art production besides the monasteries themselves. The first two centuries of this age were dormant and preparatory, the last two alone were productive.

ARCHITECTURE. The architecture of this period is called by the names of various schools, which are merely topographical variations of the general style, e.g. the Lombard (q.v.) in Northern Italy, the Rhenish in Germany, the Saxon and Norman (q.v.) in England, the Provençal and Norman in France. The works of each may be divided into two groups according as its buildings were unvaulted or vaulted. The unvaulted type was the earlier, and in some sections continued until the end; the vaulted type was an innovation after A.D. 1000, and gradually spread over many of the most progressive regions and prepared the way for the ideal vaulted style—the Gothic. Up to A.D. 1000 the style in some regions was practically a continuation of early Christian art, as in the basilican churches of Rome, but certain new elements were introduced in the north, among which the chief were the development of the cruciform plan with elongated choir; double choirs, often raised; double transept; substitution of piers for columns or alternation of the two; crypts; and bell-towers as part of the plan.

These innovations affected the scheme and composition rather than the style of construction or ornamentation. An Eastern influence is seen in a number of circular or polygonal domed churches, among which the Cathedral of Charlemagne at Aix-la-Chapelle is the masterpiece. The systematic and elaborate planning of the buildings of a great monastic establishment belongs to this period, as is shown at Saint Gall (q.v.). The church at Michelstadt is an example of the oblong plan. Saint Michael at Hildesheim (1003-13) brings us to the threshold of the next stage, when vaulting began to be substituted for wooden ceilings. Thus far there had been no development of sculptural ornament or moldings; the style was perfectly plain. In Italy, from which the earlier builders in the north of Europe had originally come, the changes were hardly felt at all, and examples of timber-roofed churches scattered from one end of Italy to the other show the continued prevalence until long after A.D. 1000 of the plain basilical plan without transept or choir, but with occasional use of the crypt (q.v.), a feature developed in the monastic churches of the north.

The renovated civilization of the eleventh century created an architecture worthy of standing by the side of the new scholastic theology, of the revived faith that led to the Crusades, and of the reconstituted organisms of Church and State. It was natural that the free republics of Italy should lead in the field; their rivals were the Rhenish and Saxon cities of the new German Empire and the Romance cities of Provence and the rest of Southern France. The eleventh and twelfth centuries were marked by extraordinary creative activity in the development of new types of monastic buildings (see MONASTERY) and churches, but also in the creation of entirely new classes of buildings, such as feudal castles (q.v.), and artistic city houses. The monastic artists were soon rivaled by the lay guilds. The impression made by a study of Romanesque monuments throughout Europe is of unequaled variety, inventiveness, and boldness in seeking unconventional solution of architectural problems. In the absence of organized national life, each province developed its special style. Certain general characteristics are, however, evident. The introduction of vaulting led to the general use of heavy walls in place of the thin walls that had sufficed for wooden roofs. Doors and windows had to be splayed and decorated with moldings, carving, and sculptures, which became increasingly rich and varied. The proportions were entirely changed by the use of the vault; the nave was necessarily narrower and was raised higher in order to give room for windows under the base line of the vault. Heavy piers replaced columns and were membered with engaged shafts corresponding to the vaulting ribs and pier arches.

Thus beginning about A.D. 1000 with plain square piers and plain openings, with very heavy walls (as at Vignory in France with its wooden roof), we proceed through progressive stages until in the twelfth century we get to the richness of Saint Servin at Toulouse and the Abbey of

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Vezelay or of Peterborough, Ely, and Durham. Only in a few provinces where early Christian and classic traditions were strong, as in Rome and Tuscany, did the old columnar basilica maintain its sway. Æsthetically the Romanesque style impresses by its seriousness of purpose, its massiveness, and its originality. The substitution of vaulting in place of the combustible wooden roof introduced an entirely new structural problem, and the Romanesque attempts at its solution were endlessly varied: domes, round and pointed tunnel vaults, unribbed and ribbed groin-vaults of every conceivable form were used. The architects were seeking for a perfect equilibrium of parts. This was not discovered until the Gothic ribbed vault and flying buttress were evolved in the latter part of the twelfth century.

ITALY. In Italy especially, the diversity of styles during the Romanesque period is extreme. Venice, for example, is predominantly Byzantine, not only in Saint Mark's with its domes and mosaics, and in the churches of Torcello (Cathedral and Santa Fosca) and Murano, but in its private palaces with their stilted arcades, marble façades, and sculptured ornament. Then again, the cosmopolitan culture of the Norman kings of Sicily produced a gorgeous architecture made up of Latin, Greek, and Arabic elements, as in the cathedrals of Cefalù and Monreale, and the Cappella Palatina at Palermo. In Calabria there appears a pure Byzantine style, with tiny domical churches, like those of Greece; in Campania, especially at Ravello and Salerno, Moorish and Byzantine influences sometimes predominate, though we often find a strong Lombard element. Working northward, we now find two main divisions, based on different principles: the classic and the Lombard. The classic school is represented by the Roman provinces and Tuscany, which produced works of great beauty of form and color, but covered with the wooden roof. This school is best represented by the mediæval basilicas of Rome itself, and by the cathedrals of Terracina and Cività Castellana. Its simple but majestic columnar interiors with rich mosaic ornament, its symmetrical brick campanili and exquisite architraved porches recall the best early Christian art. Less classic, but even more monumental and gayer in their exteriors, were the Tuscan churches. Here Pisa—Venice's great rival at this time—takes the lead with its cathedral, baptistery, leaning tower, and a host of other buildings, followed by Lucca, with San Frediano, San Giovanni, and San Michele as well as Pistoia, Prato, and other smaller towns. The same use of columns and roof as in Rome is combined with an alternation of black and white marbles borrowed from the East and with interior and exterior open arcades and galleries borrowed from Lombardy, as was also the use of relief sculpture on the façades.

The Tuscan churches, like the Roman and the Lombard, had a single detached bell-tower or campanile, usually to the right of the church. In this Italy differed both from the Orient and from Northern Europe, where the bell-tower or a pair of them was ordinarily an integral part of the church. The Lombard style, the second of the two great schools named above, made frequent use of the groined vault, and secured a sombre impressiveness by the heavy proportions and details that went with vaulting. Externally the same impression results from the use of plain walls of brick or stone unrelieved by marble. Sant' Ambrogio at Milan and San Michele at Pavia were the earliest examples and furnished the type; the cathedrals and baptisteries of Parma, Cremona, Piacenza, Ferrara, and Modena are all superb structures, unsurpassed by buildings of any age in Italy. In this province the baptisteries are especially numerous and important (e.g. Parma and Cremona). Here also were built the earliest town-halls of the free communes. Hardly less monumental, but with less consistent use of vaulting, are the South Lombard churches of Apulia, where the decoration is richer and more artistic than in Lombardy itself, as at Bitonto, Altamura, and Troja. The portals and wheel windows are the richest and most symmetrical in Italy. Apulia is also rich in churches showing French, Norman, and Byzantine influences. Baptisteries and towers were very few in this province, so that the churches usually stand alone.

FRANCE. It was in France that the Romanesque style, forsaking early Christian and classic traditions, and unaffected by contemporary Oriental art, first developed as an independent style merging into the Gothic. With greater homogeneity than in Italy, it nevertheless displays well-marked local variations or schools, e.g. those of Provence, Auvergne, and Périgord in the south, of Burgundy in the centre, and of the Royal Domain and Normandy in the north. It was in these schools that the successful struggle to create a vaulted style as a substitute for a wooden-roofed style was carried on, leading ultimately to the Gothic-ribbed vault and buttress. The Byzantine domical solution with a single nave was adopted in Aquitaine, especially in Périgord, where Saint Front at Périgueux, with its five domes over a Greek cross, is comparable to Saint Mark's at Venice and the Cathedral of Cahors shows how a single long nave may be covered with a row of domes. This style, at first very plain, became enriched with typical Romanesque detail and ornament through the twelfth century, and is then represented by such masterpieces as the cathedrals of Angoulême and Fontevrault. The other most fruitful early school was that of Auvergne, in which occur the earliest examples of the long choir with side aisles, ambulatory and radiating chapels, later elaborated in the Gothic style. Its masterpiece is the largest remaining Romanesque church in France—Saint Servin at Toulouse, with its imposing central tower, tunnel-vaulted nave, symmetrical composition, and rich details. Tunnel-vaulting and classic traditions are conspicuous in the southernmost or Provençal school. Saint Trophîme at Arles and Saint Gilles are celebrated for their richly sculptured portals. Ordinarily the churches were of moderate size, often with but a single nave, as at Avignon, Cavaillon, and Montmajour. Still commoner, however, was the three-aisled type with the side aisle so disposed as to receive the thrust of the central tunnel vault. The difficulty of providing a clearstory, with this arrangement, led to varied expedients to avoid the resulting dark interiors, and stimulated ingenuity in vault-building, by which ultimately clearstory windows were introduced. This school is inferior to that of Auvergne especially in the absence of the triforium to break up the wall surfaces.

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It was in Burgundy, however, that the tunnel-vaulted, three-aisled basilica was most highly developed by the monastic orders of Cluny and Citeaux; and the spread of these orders popularized throughout Europe the building methods current in Burgundy. The primitive form of this style is given in the great Church of Saint Philibert at Tournus, remarkable for its unique series of tunnel-vaults, built transversely over the nave. Of equal importance was Saint Benoit-sur-Loire, another monastic church of impressive simplicity and size, and finally the most colossal church of mediæval Christianity, the Abbey at Cluny (long since demolished), on which all the wealth of perfected Romanesque style was lavished, and whose influence extended over the whole province. The abbey Church of Vezelay is the most perfect remaining example of this influence. Autun is a masterpiece of another sort showing classic traits. Omitting some secondary schools of Middle France, there remain three principal northern schools, Champagne, Ile-de-France, and Normandy. These differed from the more southern schools in their long retention of the wooden roof to cover even their largest structures. The two great churches at Caen, the Abbaye aux Hommes and Abbaye aux Dames, which were the precursors of the early Gothic cathedrals, were at first wooden-roofed (c.1150), their groined vaults being of later date. The Norman scheme of façade, with its two high flanking towers, and the Norman system of groined vaulting, was adopted in the Ile-de-France (as at Saint Denis) and then passed into the early Gothic architecture. To recapitulate, there is in the French Romanesque a remarkable variety of methods and of vaulting, of plan, of lighting, and of external and internal decoration. The monasteries and their churches were then of far greater importance than the cathedrals, and therefore such accessory buildings as cloisters (q.v.) and chapter-houses (q.v.) form important classes. Porches (q.v.) and towers (q.v.) on the church façades were also of varied design.

GERMANY. To the political leadership of the German emperors of the tenth and eleventh centuries—the Othos and Henrys—corresponds an earlier and larger architectural activity than elsewhere in Europe. The great cathedrals of Worms, Mainz, Speyer, and Bonn show how the bishops surpassed the monasteries at a time when in France the monasteries were supreme and the cathedrals insignificant. At the same time, the wealth of monastic buildings was increased in the twelfth century by the advent of the Cistercian monks, who were great builders. The three earliest schools were the Rhenish, the Saxon, and the Bavarian-Swabian; while there were secondary offshoots in Westphalia, Hesse, the Main region, and in Alsace. While buildings were planned on a large scale, there was no attempt at solving the vaulting problem. Not a church was vaulted during the eleventh century, and during the twelfth few outside of the Rhenish school. The great Rhenish cathedrals as they now stand were mostly planned for wooden roofs and vaulted at a later date. First Speyer (c.1100), then Mainz (c.1125) were covered with square groin-vaults, the only kind that became popular in Germany, and these were followed by the great Abbey of Laach, with its oblong groin-vaults. There is, therefore, less difference between the early Christian basilicas and the Romanesque churches in Germany than in France. Some of the earliest examples are at Gernrode, Quedlinburg, Reichenau, Regensburg (Sankt Emmeran), Hildesheim (Sankt Michael). Cologne had the largest number of important churches—such as Saint Pantaleon, Santa Maria in Capitolio, the Apostles, Sankt Martin—and most of them are vaulted. Their immense central domes, with large semi-domes opening out as apses on three sides, give their interiors greater unity and grandeur than any other type in Germany. German churches have many peculiarities not seen elsewhere; for example, double choirs and transepts, one at each end, are quite common (cathedrals of Worms and Mainz, Abbey of Laach, etc.). So also is the alternation of columns and piers between nave and aisle, e.g. Gernrode and Sankt Godehard, Hildesheim. Round or octagonal towers are grouped around choirs and transepts in a way that greatly adds to the richness and symmetry of the exterior, beside the larger towers at the façade and over the intersection. No other country has so symmetrical a composition of exteriors. This is carried to great perfection in the Cathedral of Bonn. On the other hand, the interiors are bare and heavy, and there is no wealth of decorative and figured sculpture such as we find in France. Columnar basilicas were built, as at Limburg and Hersfeld, where was the most important, Hirsau, and many other places. But the pier-basilica was the commoner type. The great similarity to the Lombard churches in the exterior decoration of lines of false arcades and small open galleries proves that there was a close contact between these schools and the Rhenish, though the German is superior in beauty and picturesqueness. Besides the churches and monasteries there is a group of civil structures, the like of which was unknown in the rest of Europe; namely, the Imperial and royal palaces. Starting with the type developed by Charlemagne at Aix-la-Chapelle, there follow the palace of Henry III. at Goslar, that of Henry the Lion at Brunswick, and that of Louis III. of Thuringia at the Wartburg, best known of all.

ENGLAND. The extant architecture of Christian England antedating the Norman Conquest is very scanty. It is called Anglo-Saxon, because developed under the Saxon rulers between the seventh and eleventh centuries. The great majority of both religious and civil buildings were of wood. Even the stone cathedrals of later date (tenth to eleventh century) were small and were rebuilt by the Normans shortly after the Conquest. The workmanship was primitive, the details poor, as in the case of the Tower at Earl's Barton, where the colonnettes are like turned work, and the corner quoining suggests bands of metal (Deerhurst, Sompting, etc.). The Norman style was introduced from Normandy even before the Conquest, under Edward the Confessor; but the earlier Norman work, before 1125, was poor, with wide-jointed masonry and details executed with the axe. The chapel of the London Tower, the crypts and the transepts of Winchester Cathedral, and parts of Gloucester, Durham, Canterbury, and Norwich cathedrals show the primitive style, which was inferior to that in Normandy itself. About 1120 was begun a series of superb Norman structures, and by 1200 the main portions of Ely, Durham, Peterborough, Norwich, Rochester, Gloucester, Saint Albans, Carlisle, and other cathedrals were built, as well as a great

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number of monasteries—especially Cistercian—such as Rievaulx Fountains, Kirkstall, Waltham, Romsey, and Malmsbury. The characteristics of this style are heavy walls and piers, rich details, length and narrowness of plan, inability to vault wide spaces, lack of figured sculpture, constant use of geometric and schematic ornament, and use of both round and grouped piers. The portals are especially rich and deeply recessed, and their most characteristic ornaments are in the zigzag and beak molding. The naves are all covered with wooden roofs, but the aisles are often groin-vaulted. Especial prominence was given to the triforia, which form lofty galleries over the aisles. Few of the original façades remain for comparison with contemporary Continental examples. Of all phases of the Romanesque the Norman is the heaviest, makes the least use of vaulting (except the Tuscan), and is the least well composed, though often impressive. Toward the close of the twelfth century the heaviness diminishes, and certain parts of Ely and Norwich are charmingly symmetrical.

SPAIN. The Spanish Romanesque style commenced early in the ninth century under King Alfonso II. of Asturias, with the renewed life of Christian Spain. The new capital, Oviedo (San Tirso, San Julian), and the neighboring Naranco (Santa Maria, San Miguel) show a mixture of early Christian and Byzantine influences (c.800-850), as do later churches at Valdedios, Priesca, and Barcelona. Moorish influence also becomes prominent. With the eleventh century the south of France inspires the Spanish school in its further revival. The increased prosperity of the Christian cities of Spain, to many of which French bishops were appointed, caused a revival in cathedral architecture, which adopted the vault in all its forms, the tunneled being used ordinarily for the nave, the groined for the aisles. San Isidoro at Leon, the old Cathedral of Salamanca, that of Zamora, the church at Toro, and San Iago at Compostella are characteristic examples, Salamanca being the earliest and San Iago the most consummate work. These Spanish churches are grandiose and equal to the foremost French buildings, even surpassing them in some features, such as the effective dome over the intersection of Compostella. Examples of tunnel-vaulted hall-churches are at Gerona, Huesca, and Segovia, similar to those of Provence and Languedoc. The most important groin-vaulted churches are Santa Maria at Tudela and the cathedrals of Tarragona and Lérida, remarkable for unity of plan, solidity of construction, and beauty of detail. They bear great similarity to the school of Anjou. San Vicente at Avila has the most interesting figured sculptures on its façade and an exceptionally beautiful triforium gallery. The Spanish school reaches its most glorious period when the time approaches, toward 1200, for France to give her the Gothic as she had the Romanesque.

SCULPTURE.

In the minor forms of sculpture, Byzantine and early Christian models were generally followed during the Romanesque epoch (see BYZANTINE ART), the awakening of monumental sculpture having been due to the demand for architectural decoration.

FRANCE. Such was particularly the case during the Carolingian revival in France and Germany. In the south of France, however, stone sculpture on a larger scale was used in connection with church architecture. The façades were crowded with statues, often representing a larger composition; statues even took the place of columns in the cloisters. Technically inferior to those of the succeeding Gothic period, they were more characteristic and individual. The school of Provence was dignified and quiet in character, concealing technical deficiencies by rich decoration; that of Burgundy, more finished in technique, more fanciful and inventive, but grotesque and dramatic; that of Toulouse, more finished and studied. A curious combination of Carolingian and Byzantine influence is shown by the school which in the first half of the twelfth century created the fine façade of Angoulême, the entire sculptures of which form one composition, a "Last Judgment," and the rich portal of Cahors.

GERMANY. During the ninth century carving in ivory, after early Christian and Byzantine models, was extensively practiced. An important centre was the Monastery of Saint Gall, where Tutilo was the chief master. Foreign influence rather increased under the Othos, being promoted by their frequent expeditions to Rome, and the marriage of Otho III. with the Byzantine Princess Theophano. Though ruder than their models, the native workmen display more naturalism and individuality. Monumental sculpture did not arise until the eleventh century, through the instrumentality of Bishop Bernward of Hildesheim. Impressed by the columns of Trajan and Marcus Aurelius at Rome, he erected one of his own at Hildesheim, besides furnishing his own cathedral with bronze doors. His school was especially occupied with articles of church furniture, and invented bronze sepulchral slabs. Among its most important productions are the portals of the cathedrals at Augsburg, Verona, and Gnesen, the baptismal font of Merseburg, and especially the beautiful gold altar front which Henry II. presented to the cathedral at Basel.

ITALY. During the twelfth century, in connection with façade decoration, a species of Romanesque sculpture originated in Lombardy and Tuscany, which during the thirteenth century was applied to interior decoration as well. Its technique was rude, the figures being short and coarse, the expression and dramatic action childish, the draperies very primitive. The best work of this school is found in Lombardy, especially in the cathedrals of Modena and Ferrara, in Saint Zeno, and the Cathedral at Verona. During the later twelfth century considerable progress was made by Benedetto Antelami, whose sculptures in the Cathedral of Parma and the neighboring Borgo San Donino show nature study and a sense of form and motion. At Venice Byzantine influence prevailed, but the sculptures of the main portal of Saint Mark, and, in the interior, the angels under the cupola are Romanesque in character. The Tuscan sculptures are more primitive in character; the revival under Niccola Pisano in the thirteenth century is of sufficient importance for general development to merit treatment in the article SCULPTURE.

PAINTING.

GERMANY. Mural painting was extensively practiced under the patronage of Charles the Great, but of the decorations which we know existed in the royal palace and in the churches no

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examples survive. Contemporary miniatures, however, which correspond in the main with these frescoes, reveal an art still following early Christian traditions in general plan, but possessing a highly developed system of ornament, Germanic in character. Under the successors of Charles painting declined, but with the development of Romanesque architecture it found increased employment, as early as the ninth century, on the large wall surfaces of most German churches. These paintings are executed with rapid technique, and are decorative in color and design, the background being generally blue, the colors light, and the halos of saints and borders of costumes laid over with gold. Though inferior to contemporary Byzantine art in technique, they contain elements which it lacks—life, character, and action. The oldest examples are in the Church of Oberzell in the island of Reichenau (tenth century); of better quality are, among others, the paintings in the lower Church of Schwarzrheindorf (twelfth), and in the cathedrals of Brunswick and of Gurk in Carinthia (early thirteenth). Panel painting was also practiced, especially upon the ceilings of flat-roofed basilicas, of which the best example is that of Saint Michael's at Hildesheim (after 1186). Smaller panels upon gold backgrounds were also used, at first as the antependia of altars.

FRANCE AND ITALY. Romanesque wall paintings in France are not so common, the most important being in the central provinces—in the chapel at Liget (Indre-et-Loire), in Saint Jean at Poitiers, and Saint Savin at Poitou—all dating from the twelfth century. In Italy painting lagged far behind, being purely mechanical, and for the most part under Byzantine influence. Roman examples of the period are excessively rude, while the frescoes at Sant' Angelo in Formis at Capua, like others in Southern Italy, were probably executed by native artists under Greek influence. In the mosaics of the period Italian pictorial art found its best expression, especially in those at Venice and in Sicily. (See MOSAIC.) They, as well as other paintings, were dominated by Byzantium, which throughout the epoch also influenced painting in France, and to a less extent in Germany.

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ROMANINO, rō'mä-nē'nō, GIROLAMO (1485-1566). An Italian painter of the Venetian school, born in Brescia. He was probably a pupil of Feramola, or Chiverchio, and is little known outside Italy. He painted chiefly in his native city, and most of his work is to be found there and in the surrounding country. He was a fine colorist, with peculiar skill and charm in the use of light and shade, but was uneven in his treatment. His works include a large "Madonna," in the Doria Gallery at Rome (attributed to him by Morelli); "Nativity" (1525), in the National Gallery, London; a "Madonna and Saints" (1513), in the Padua Gallery; and a "Last Supper," in the same place. He also left a few notable portraits.

ROMAN LAW. See CIVIL LAW.

ROMANOFF, rō-mä'nōf. The Imperial House of Russia. It first appears in Russia in the fourteenth century when Andrew Kobyla came from Prussia to Moscow (1341) and entered the service of the Grand Duke Simeon. The boyar Roman Yurievitch, the fifth in direct descent from Andrew, died in 1543, leaving a son and a daughter, the latter of whom became Czarina by her marriage with Ivan the Terrible (1547). The son, Nikita, was one of the regency during the minority of Feodor I., and his eldest son, Feodor, under the name of Philaret, was elevated to the rank of Archimandrite and Metropolitan of Rostov during the reign of the false Demetrius (1605-06). He refused to recognize the Polish Prince Ladislas as Czar of Russia in 1612, and for this the Poles took him with them on their retirement from Moscow in face of the nationalist rising, and held him captive for nine years. In February, 1613, the Russian nobles and clergy chose as their ruler Michael Feodorovitch Romanoff, the son of the imprisoned Metropolitan, and the representative, through his grandmother, of the royal House of Rurik. He was succeeded by his eldest son, Alexis (1645-76). Alexis was twice married, and left by his first wife two sons, Feodor and Ivan, and several daughters, and by his second wife one son, Peter. His eldest son, Feodor (1672-82), died without issue, and was succeeded by his half-brother, Peter the Great, with whom Ivan was associated until 1689. Peter was twice married; by his first marriage he had a son, Alexis, who died in his father's lifetime, leaving one son, Peter. Peter the Great was succeeded by his wife, Catharine I. (q.v.), by whom he had two daughters, Anna and Elizabeth. Catharine I. (1725-27) left the throne to the son of Alexis, Peter II. (1727-30), the last of the male line of Romanoff; and on his death without heirs the succession reverted to the female line, the daughter of Ivan, Peter the Great's half-brother, Anna Ivanovna, being placed upon the throne (1730-40). She was succeeded by her infant grand-nephew, Ivan IV. (1740-41). A

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revolution drove Ivan's family from the throne, of which the cadet female line in the person of Elizabeth (1741-62), the daughter of Peter the Great and Catharine, now obtained possession. On her death her nephew, Peter, the son of her elder sister Anna Petrovna, who had married the Duke of Holstein-Gottorp (belonging to a cadet line of the family of Oldenburg), mounted the throne as Peter III. (1762). He was dethroned and succeeded by his wife, the Princess Sophia Augusta of Anhalt-Zerbst, who reigned from 1762 to 1796 as Catharine II. She was succeeded by Paul I., her only son by Peter III. Paul (1796-1801) perished by assassination, leaving several sons, the eldest of whom was Alexander I. Alexander (1801-25) left no heir, and the crown at his death devolved by right upon his next brother, Constantine. Constantine, however, in compliance with the wish of Alexander, had previously relinquished his claims to the supreme power, and the third brother, Nicholas I., ascended the throne. Nicholas (1825-55) was succeeded by his son, Alexander II. (1855-81). Alexander II. was assassinated in 1881, and his son, Alexander III., succeeded him, to be followed in 1894 by his son, Nicholas II. Constant intermarriages with German princely houses have made the Romanoff strain of to-day far more German than Russian. Consult Edwards, *The Romanoffs: Tsars of Moscow and Emperors of Russia* (London, 1890).

ROMAN RELIGION. The attitude of the Romans toward their gods necessarily altered much with the numerous changes which accompanied the development of the little settlement on the Palatine into the mistress of the world. Yet the conservative nature of the Romans led to the preservation of many ancient rites, long after their origin had been forgotten and the ancient beliefs had passed away. Here, however, we are concerned less with this development than with a statement of the various elements which appear in the religion as recognized by the State, expressive of the official attitude toward the gods at the time of their adoption, and even when faith had failed, continued as essential parts of the governmental system. Such a statement is rendered extremely difficult by the absence of any natural development along discernible lines from primitive forms. The original religion of the early Romans has been so overlaid and transformed by the accretions of later times, and in particular by the assimilation of the whole structure of Greek mythology, that any summary reconstruction must give much that is rather probable than certain. Unfortunately, the most extensive alterations were already accomplished long before the Roman literary tradition began, and though such writers as Varro and Verrius Flaccus had many sources from which to draw, the origins were in most cases unknown to them, while Ovid in his *Fasti* is obviously strongly influenced by his Alexandrian models, and has frequently transformed Greek myths to fill the gaps caused by the lack of such stories in Roman tradition. The fundamental basis for the study of the early Roman religion is found in the Calendars or Fasti, of which some thirty are known, only one of which (the Fasti Maffeiani) is nearly perfect. All can be dated between B.C. 31 and A.D. 46 and are the result of the revision of the calendar by Julius Cæsar. These documents, however, are plainly composed of two elements, distinguished by the size of the letters, and it can scarcely be doubted that the large capitals represent the official pre-Julian Calendar, as published, we are told, for the first time in B.C. 304, to make known the days when business could be legally transacted. The names and days of 45 public festivals (*feriæ publicæ*) of fixed dates were indicated. This calendar is supplemented by the literary tradition, which largely rests on the lost works of the great Roman antiquaries, and in the use of which it is necessary to distinguish sharply between the statements as to actual religious observances and the deductions or explanations evolved by the writers themselves.

The Roman ritual clearly distinguishes two classes of gods, the *di indigetes* and the *di novensides* (or *novensiles*). The latter were the new introductions, and in fact we find that all divinities whose cults were introduced in historical times were reckoned among them. It seems reasonable to see in the *Indigetes* the original gods of the Roman State, and their names and nature are indicated by the priests of the first class, and the fixed festivals of the Calendar, supplemented by other notices; for though the Calendar was not published until B.C. 304, it had long been in existence as part of the secret knowledge of the pontiffs, and there is good reason for believing that it goes back to an early stage in the regal period. This analysis yields a list of over 30 names honored with special festivals or special priests, and showing on the whole a well-defined field of activity, which is appropriate to a distinct type of community. Moreover, there is a strong tendency to incorporate in a pair of male and female divinities either the same function or two complementary fields of activity. So we have Jouis and Jouino (Juno), Faunus and Fauna, Janus and Vesta, etc. In most cases the female divinities have no independent cult and gradually fade away. Vesta, of course, is a marked exception, and Juno an apparent one, though here the later prominence of the goddess is due to the independent development of foreign elements. In addition to these gods, who seem to have attained a special prominence, there is evidence that the early Roman religion worshiped a host of 'specialist gods,' as they have well been termed. Fragments of old ritual accompanying various acts, such as plowing or sowing, show that at every stage of the operation a separate deity was invoked, whose name is regularly derived from the verb for the operation. Such divinities also may well be grouped under the general term of attendant or auxiliary gods, whom we find invoked along with greater deities. At the head of this early pantheon stand five names: Janus, Jove, Mars, Quirinus, and Vesta, of whom the second, third, and fourth form an ancient triad, while their special priests are the three greater Flamens, *Dialis*, *Martialis*, *Quirinalis*, and the first and fifth are said to be the proper gods to begin and end any invocation of a number of divinities; and a similar position, before and after the three Flamens, is held by representative priests, the *Rex sacrorum* and the *Pontifex maximus*. The Indigetes and their festivals show that we are dealing with an agricultural community, but also one fond of fighting and much engaged in war. The gods represent distinctly the practical needs of daily life, as felt by the Roman community to which

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they belong, and which scrupulously pays them the proper rites and offerings. Thus Janus and Vesta guard the door and the hearth, the Lar protects the field, Pales the pasture, Saturnus the sowing, Consus and Ops the harvest, Ceres the growth of the grain, and Pomona the fruit. Even Jupiter, who seems to be the god of heaven, is honored chiefly for the aid his rains may give to the farms and vineyards, though he also, through the lightning, guides the acts of men, and by his widespread domain can aid Romans outside their borders. That war was a large part of this early life seems clear from the prominence given to the two war gods, Mars and Quirinus, of whom the former was specially honored in March and October, i.e. at the opening and closing of the campaign, while the latter seems to be patron of the armed community in time of peace. In this early stage of the Roman religion there seem to be no temples or images of the gods, who are worshiped in sacred groves, or at altars in the open air; Vesta, as her nature requires, has her own house. In fact, there is no real individuality in these early gods, nor are there any marriages or genealogies. Mythology is not a Roman invention. The scanty traces of legend sometimes gather about a sacred animal, which is a sign of the presence of the deity or some token which could recall him to the worshiper, such as the flint of Jupiter, or the spear and shields borne by the Salii in honor of Mars. This older worship is associated by Roman legend with the early days of the city, and especially with Numa Pompilius, and though the name may be an invention, the location of the sanctuaries indicates an early period in the growth of the city.

At an early date, however, new elements were added to this ancient system. The legend ascribes to the royal house of Tarquin the establishment of the great Capitoline triad, of Jupiter Optimus Maximus, Juno, and Minerva, which soon assumed the supreme place in the Roman religion. Other additions were the worship of Diana on the Aventine, and the introduction of the Sibylline Books, and the appointment of men to care for them, and to carry out the sacred rites which they directed. All these changes are the introduction of foreign cults; partly apparently from the Latin league in which Rome had acquired a leading position, partly from Etruria, where, however, Greek influence had also been at work, and partly from the Greek cities of Southern Italy, especially Cumæ, with which legend directly connects the Sibylline Books. This new movement brings with it temples, built at first in the Etruscan style and apparently by Etruscan architects, though later by Greeks. The Capitoline sanctuary became the central shrine of the Roman State, and one of the privileges granted a colony (*colonia*) was the right to found a similar Capitolium in honor of the three gods. Thus, though a later introduction, these new deities quickly assumed a place beside or even above the ancient gods, and their representatives were recognized as equal members of the hierarchy. From this time, which must have preceded the establishment of the Republic, the history of the Roman religion is that of a constantly increasing number of divinities. The cults brought from foreign parts, especially Greek lands, under the direction of the oracular books and requiring the importation of a native priesthood, were carefully kept outside the Pomœrium, and when such Greek gods as the Dioscuri had a temple in the Forum, the apparent exception is easily explained by the high position of Castor and Pollux at Tusculum, whence their worship was brought to Rome.

The absorption of the neighboring native gods is easily understood. Since the earlier gods had been regarded as peculiar to the Roman State, as that State grew and conquered the surrounding territory, the new local gods became entitled to receive at the hands of the Romans those honors which had before been their due. In many cases we hear of a formal invitation to these gods to take up their abode in the new sanctuaries provided at Rome. Moreover, the growth of the city attracted foreigners, who were allowed to continue the worship of their own gods. Besides Castor and Pollux the Italian communities seem to have contributed to the Roman pantheon Diana, Minerva, Hercules, Venus, and others of lesser rank, some of whom of course were originally derived from Greece, though others may well have been Hellenized from Italian divinities. From the Greeks came at an early date Apollo, and in B.C. 496 the Sibylline Books ordered atonement to Demeter, Dionysus, and Kore, whose temple was dedicated under the Latin name of Ceres, Liber, and Libera, through an identification of the Greek divinities with the old Roman gods. About the same time Hermes, under the name Mercurius, was recognized as the god of merchants and trade. Both these cults are connected by legends with a famine, which may well have led to their introduction along with the grain of the south. Poseidon appears among the Roman gods under the name of an old Italian divinity, Neptunus, as early as B.C. 399. These cults seem all to have been introduced at a relatively early date in the history of the Republic; and then for a time the expansion seems to have taken place rather by the assimilation of Italian divinities, often as new phases of the old cults, or by the creation of new gods, especially from abstract qualities such as Fides (Fidelity) or Bellona (as goddess of war). In B.C. 293, however, under the destruction wrought by a severe plague, the Sibylline Books advised summoning the god Æsculapius from Epidarus. In B.C. 249 followed the introduction of the cult of Hades and Persephone under the Latinized names of Dis Pater and Proserpina, and in their honor the first celebration of the ceremonies from which developed the secular games (q.v.). In B.C. 205 the circle was further widened by the presence of the first of the Eastern gods, Cybele, the *magna mater*, whose sacred stone, probably meteoric, was brought with great pomp and amid many miracles from Pergamum, through the favor of Attalus, who seems to have secured it from the holy temple of Pessinus.

At the same time the process of Hellenization was advancing in other ways, and the pressure of the Second Punic War seems to have aided its progress, from the need then felt of appeasing the angry gods by more powerful atonements. Now we find a cycle of twelve gods (*di consentes*) obviously derived from the Greek, though the divinities are partly Roman, officially recognized by statues in the Forum, and from this time we hear little of the introduction of new Greek divinities; the change takes place rather in the identification of Greek gods with Roman, and the

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consequent transference to the Roman deities of a large mass of Greek myths, whereby the original nature of the gods was more and more obscured. Moreover, the newly developing Roman literature was so thoroughly saturated with Greek thought even where it was not direct translation, that it powerfully aided in popularizing Hellenic conceptions.

With the coming of Cybele the orgiastic element was added to the attractiveness of the Greek ceremonial, and in spite of some efforts at restriction speedily exercised a destructive influence, which reached its height a few years later when the orgies of the Bacchanalia called for the severest measures from the Senate. The tendency, however, was not to be checked, and the long wars in Asia Minor, the seat of strange cults, together with the growing disbelief in the old gods and the search for new superstitions among many belonging to the upper classes, furnished abundant material for its growth. Asiatic, Egyptian, and even Semitic cults of farther east poured into Rome under the Empire until they had almost supplanted the old religion in the popular mind.

The effect of the transference of Greek myths to the State religion, and perhaps even more of the prevalence of Greek philosophy among the educated, was to bring about an increasing neglect of the old rites, and in the first century B.C. the old priestly offices declined rapidly, for the men whose birth called them to these duties had no belief in the rites, except perhaps as a political necessity, so that pontiffs, augurs, and such bodies became mere tools in the party strife. A thorough reform and restoration of the old system was carried out by the Emperor Augustus, who became himself a member of all the great priestly colleges, revived some that had become extinct, such as the Arval Brothers, and rebuilt temples which had fallen into ruin. With all this revival was joined the prominence given to Apollo as a patron god of the Emperor, through the erection of the splendid temple on the Palatine, the intrusting to its guardianship the State collection of oracles, including the Sibylline Books, and the joining Apollo and Diana with the Capitoline gods in the secular games. In spite of these reforms, the religion tended more and more to centre in the Imperial house, and this was stimulated by the deification of certain emperors, with the title *divus*. At first the honor of reception among the gods of the Roman State after death was bestowed upon but few. The first was Julius Cæsar, then follow Augustus, Claudius, Vespasian, and Titus, while after Nerva few emperors failed to receive this distinction. This cult was more prominent at first in the provinces than in Rome, and it was outside that the actual worship of a goddess *Roma* seems to have arisen. The personified Roma had appeared on coins and elsewhere, and had been the object of foreign dedications under the Republic, but her reception among the State divinities was due to the erection of the great temple of Venus and Rome by Hadrian in A.D. 128.

The forms of the Roman religion were naturally as varied as the origins of the numerous cults which it included. The early worship seems to have been marked by the simplicity to be expected from such a community as gave it birth. The first fruits of field or garden, or flocks, flowers, and wreaths, the coarse pounded grain, and cakes were the usual gifts, which on some occasions took the form of a meal set before the god. Such offerings might be made by family or community at their own altars, and when made by the State differed only in the size of the offering, so that public animal sacrifices, especially of the larger animals, were more frequent. But if the offering was simple, the ritual was complex. The vessels and implements were prescribed and bespeak the primitive civilization of the early worship. On some occasions at any rate the sacrificial knife was of flint, the vessels of clay, molded without the aid of the potter's wheel, and the victims must correspond exactly to the minute requirements of the law. The prayers and gestures of the priest were prescribed in detail and must be repeated with the most scrupulous accuracy, so that it is easy to see the importance of the college of pontiffs in whose charge were the books of ritual, and without whose assistance few magistrates could have performed their religious duties. The *Græcus ritus* naturally was conducted according to the usages of the country from which the god had been brought, but the Hellenization brought the increase of *ludi*, or games and spectacles, as part of the worship, and especially the institution of the *supplicatio* and *lectisternium*, wherein the gods were placed on couches beside prepared tables, and feasted for one or more days, while at the same time the people were summoned to visit the temples and pray, either in supplication if the celebration sought some gain, or in thanksgiving if a victory was the occasion. The *lectisternium* or banqueting of the god also took place in his temple on the day of its special festival, but in its extended form, when several gods were brought together into one place for the banquet, regularly formed part of a solemn act of purification and entreaty or of special thanksgiving.

This whole structure rested on the Roman theory of a legal relation between men and gods. Worship is an ordinance of the State, established by the fathers and unalterably binding on the children; and it is exactly the gods thus adopted at the founding of the State, the *di indigetes*, that have such a special position in the possession of a special hierarchy and the intricate ritual. To these old obligations new ones temporary or lasting were added from time to time by the vow public or private, in which the supplicant solemnly promised to pay to the god certain honors if his prayer was heard, and when uttered by a representative of the State in his official capacity this became binding on the whole community.

For further details of the Roman religious system, see the articles on the individual gods and also ARVAL BROTHERS; AUGURIES AND AUSPICES; FLAMENS; LUPERCALIA; PONTIFEX; SALII; SUOVETAURILIA; VESTA.

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ROMANS, rō'mān'. A town in the Department of Drôme, France, on the right bank of the Isère, 11 miles northeast of Valence (Map: France, M 6). A bridge built in the ninth century connects Romans with the small town of Péage on the left bank of the river. Romans owes its origin to an important abbey, founded in the ninth century by Saint Bernard, Archbishop of Vienne, and by a nobleman named Romain, who gave his name to the town. Silk and woolen fabrics, leather, shoes, hats, and oils are largely manufactured, and a very active general trade is carried on. Population, in 1901, 17,140.

ROMANS, Epistle to the (translation of Gk. ἐπιστολὴ πρὸς Ῥωμαίους, *epistolē pros Rhōmaious*). One of the New Testament letters of the Apostle Paul and the one generally recognized as his most important production. It was written in the winter of 55-56, or the early spring of 56, at the close of the Apostle's third missionary journey, during his last visit to Corinth, after he had practically finished his work in the East. It was addressed to the church at Rome, which he had not founded or even seen, largely for the purpose of preparing for the visit which he hoped soon to make.

Its Pauline origin has received practically universal recognition, even the Tübingen School (1845) accepting it as one of the five New Testament books which they held to be genuine. It is rejected by the Modern Dutch School (1882) in accordance with their rejection of the entire New Testament—generally speaking. This position, however, is largely ignored by scholars today, in view of what are thought to be the unscientific principles on which it is based. A characteristic feature of this school's criticism is its tendency to consider the epistolary as well as the historical books of composite origin, the application of which tendency to Romans has been made by several writers beyond the distinct membership of the school. But the results claimed for this documentary handling of the Epistles have met with such scant acceptance by the critical world that they have been practically neglected in the estimate of the genuineness of these writings. This is especially true in the case of Romans.

The three questions of present interest in the study of the Epistle are (1) the relation of the last chapter to the rest of the letter, (2) the national character of the membership of the Church, and (3) the situation in the Church which the letter was intended to meet. As to the first question, there can be little doubt that there are striking peculiarities in the closing portion of the Epistle, as it now stands. (1) In the sequence of thought it is noticeable that the benediction occurs twice—once at verse 20 in chap. xvi., and, previously, at the last verse of chap. xv. In sympathy with this benedictory repetition there seem to be other endings to the Epistle besides that at its close, viz. at verse 20 of chap. xvi. (vs. 17-20), at verse 33 of chap. xv. (vs. 30-33), and, in addition to these, at verse 16 of chap. xvi. (vs. 3-16). (2) In the contents of the chapter it is marked that in a church which Paul had neither founded nor visited there should be so many personal acquaintances and fellow-companions with him in his work (cf. especially vs. 3, 4, 7, 9, 11, 13). To account for these peculiarities several theories have been advanced, the most widely accepted of which is perhaps the one first proposed by Schulz (1829) and adopted by many scholars since his day, viz. that this last chapter belongs to a letter addressed by Paul to Ephesus, where he had been at work for some years. It is true that with the circumstances and surroundings of Paul's Ephesian work several of the names seem strikingly in accord (e.g. Priscilla and Aquila [cf. I Cor. xvi. 19, II Tim. iv. 19] and Epænetus, who is spoken of as "the first fruits of Achaia unto Christ"). More than this, the fact that this last chapter was written from Corinth or its neighborhood (xvi. 1), and that between this city and Ephesus Paul had frequent communication on church affairs, might not only account for the direction in which the letter was sent, but also for its coming to be attached to the Epistle to Rome; since, if copies of both letters were retained in Corinth, the distinction between them might finally disappear and they be thought to be parts of one letter. This would be especially true if, in the course of time, the letters came to be mutilated. Fragments are naturally pieced together. Finally, the omission of this last chapter—and even the one preceding it—in some important manuscripts, and the fact that the doxology which now stands at the end of chap. xvi. (vs. 25-27) evidently stood originally at the end of chap. xiv. would seem to point to the possibility of there being at least two letters combined in our present Epistle. On the other hand, when it is remembered that the Epistle was at a very early date altered for dogmatic and liturgical purposes, and that the position of the doxology at the end of chap. xiv. is in accord with Paul's habit of introducing such passages into the body of his letters rather than reserving them for the end; further, when it is recognized that it was Paul's custom to append to a marked degree personal salutations to the letters he wrote to churches he had not founded and in which he had not worked (cf. the concluding chapter of Colossians with those of Thessalonians, Corinthians, Galatians, and Philippians); and when it is realized that the Church at Rome was not only largely Gentile in its membership (i. 5-7, 13-15; xi. 13, 14; xv. 14-16), but that the irresistible drift from all parts of the Empire to Rome must have carried with it many of the converts from Paul's eastern mission fields, especially from the large cities of Antioch, Ephesus, and Corinth; and when it is understood that from funereal inscriptions in Rome and inscriptions containing names belonging to freedmen and members of the Imperial household, practically all the names in chap xvi. can be shown to be possible Roman names, while from Ephesian inscriptions and from those of the Western Asia

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region in which the Apostle's work was done, only a small proportion of them are so traceable—when these facts are taken into consideration much is disclosed in favor of the view held by a considerable number of modern scholars that the chapter is an integral part of the Epistle to Rome. In the case of either theory, however, the difficulty in the repetition of the benediction and the apparently final passages would be referred to the Apostle's occasional habit of interrupted closing thought, as manifested in admittedly Pauline Epistles like Philippians (cf. iv. 7, 9, 20, 23; see also II. Thess. ii. 16, iii. 5, 16, 18), although the Ephesian theory has manifestly less of this repetition to account for.

As to the second question, while there is essential agreement as to the mixed character of the church's membership, there is considerable discussion as to whether the dominant element in the church was Jewish or Gentile. On the one side passages such as vii. 1-6, viii. 15, ix. 1-5, x. 1-3 are appealed to as showing a recognition by the Apostle of the Hebrew character of the church to which he was writing. On the other side passages such as i. 13-17, xi. 13-32, xv. 14-17 are cited as showing the consciousness on the Apostle's part that he was writing to a church to which his Gentile apostleship specifically commended him.

As to the third question, it is clearly the one of greatest significance, since an understanding of the situation of the church to which the Apostle is writing must contribute definitely toward determining our understanding of the purpose behind the letter's writing, and an understanding of this must largely determine our understanding of the letter itself. In general, of course, this purpose was what we have stated: a desire on the Apostle's part to prepare the way for his coming visit to this stranger church; but, while this desire may account for the sending of a letter in advance of his expected departure for the west, the specific character of the letter so sent must be accounted for by something beyond this general desire. This something is primarily the condition of the church to which he is writing: for Paul's letters were all determined by the necessities they were intended to meet. The views as to what the situation was are legion, though perhaps they may be roughly gathered into three groups: (1) The group which holds that either through the importance of the church as a church, or through its unacquaintance with the Apostle as a teacher, it invited him to a systematic presentation of Christian truth. This is the oldest view and the one which has most generally prevailed. It has in its favor the peculiarly systematic character of the Epistle, unique among Paul's writings; but against it is the fact that the system presented is manifestly incomplete. Within the range of Christian truth there are practically but two topics presented: the doctrine of man and the doctrine of salvation. This constriction is recognized by some of those who hold this view, and to account for it they suggest that it was the Apostle's idea to emphasize that portion of the general truth of Christianity which was characteristic of his Gospel. This, however, would be fatal to the view itself, while it would raise at once the query how it came that a church, such a proportion of whose active workers were either converts from the Apostle's mission field or personally acquainted with his work, should need an exposition of the Gospel he characteristically preached. (2) The group which holds that through either the actual presence or the threatened coming of Judaizing teachers the church was in need of a vigorous combating of their peculiar errors. This was the view proposed by the Tübingen School and participated in the wide success which the school's critical position secured for itself. In its favor is (a) the polemic tone of certain parts of the Epistle, notably in chaps. ii.-iv., vi., ix.-xi., which seem to betray a conflict between the Jewish and Gentile elements in the church, together with (b) such references to partisan conditions in the church as are given by chaps. xii., xiv.-xvi., though these do not necessarily involve Judaizing dissensions. Opposed to it, however, is the fact that the Epistle really gives no sign of the presence or the expectation of Judaizers in the church. Neither the polemical nor the partisan passages above referred to imply a Judaistic situation. The Epistle is not a controversial writing as Galatians and II. Corinthians are, in spite of its polemic tone. Indeed, the peculiar Gentile character of the church makes the likelihood of such a propaganda exceedingly remote. Rome was the last place to which such a party would drift. (3) The group which holds that the acknowledged partisan condition of the church was of a character that called for an irenic treatment on the Apostle's part. This was suggested as early as Augustine, reappearing subsequently at times. It has come into favor lately largely through the growing conviction of the untenableness of the other views. There is much in its favor, especially the characteristic combination of Jew and Gentile in the earlier part of the Epistle, and yet the question forces itself upon us: If this view be correct, how are we to understand the pronounced Gentile rebuke contained in chaps. ix.-xi.? From all this it is apparent that no one of these groups will fully account for the phenomena which the Epistle presents. The problem, therefore, may be said to be still under discussion.

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ROMANS, KING OF THE. A name applied to the elective head of the Holy Roman Empire (q.v.) before his coronation as Emperor by the Pope; he was also known as the German King. After 962 the German King was regarded as having a prescriptive right to the Imperial title, *Imperator Romanorum,* and thus in the course of time the candidate for the Empire came to be known by anticipation as *Rex Romanorum.* Charles V. was the last head of the Holy Roman Empire to be crowned by the Pope, and beginning with his successor, Ferdinand I., the King of the Romans was also styled Elected Roman Emperor. The King of the Romans was as a rule elected during the lifetime of the Emperor. Napoleon I., who aspired to the traditions of the older Empire, named his son King of Rome.

ROMANSH. See ROMANCE LANGUAGES.

ROMANTICISM (from *romantic,* Fr. *romantique,* from OF., Fr. *roman,* novel, romance). A term commonly employed to designate the modern rise and development of imagination and sensibility in the literatures of Western Europe, and to indicate the tendency of nineteenth-century authors to rid literature of Greek and Roman rule. Romanticism, as a tendency, is sometimes opposed to the restraint of classicism, and again to the literalness of realism. On the one hand classicism, which had once been so warmly espoused by the humanists, had degenerated into a feeble effort to express the modern world in a high-flown but lifeless jargon in which mythological references still abounded. This was especially true of the drama. On the other hand, a certain school of realists, who came after the tide of romanticism had begun to ebb, hampered their imaginations for the sake of what they believed to be scientific transcriptions of life. Against these realists the later romanticists rebelled. It may be said that realists and romanticists (or romancers) have worked peacefully side by side since as early as 1850, and both schools have found common readers.

In the Augustan period English literature, barren of strong passion except the indignation of satire, made its primary appeal to the intellect; its ideal was 'good sense.' Pope reasoned in verse, writing essays in criticism and in morals; Swift employed the fantastic romance to satirize his contemporaries and mankind as a species; Addison ridiculed with urbanity the foibles of society; and rarely did any writer look beyond London. It was the province of romanticism to rediscover that man is more than intellect; that he possesses imagination and emotions. Between 1726 and 1730 James Thomson, a Scotch poet, published his *Seasons,* poems which definitely mark a new interest in external nature. He was followed during the next few years by many imitators, known as the landscape poets; then came Gray's "Elegy in a Country Churchyard," Goldsmith's "Deserted Village," and Cowper's "Task." This descriptive poetry reached its highest development in Scott, Byron, Keats, Wordsworth, and Shelley, who lent to nature "the light that never was on sea or land." By the middle of the eighteenth century the lyrical cry, which had long been suppressed in English literature, broke forth once more. At first it was a refined melancholy, as in Collins and Gray; afterwards it broadened into a noble humanity in Cowper, Burns, and Wordsworth. Finally passion and description were fused in the lyrics of Shelley, where, says Woodberry, "nature is emptied of her contents to become the pure inhabitancy of the human soul." Again, the age of Pope and Addison had lost the mood of superstition and wonder. That mood soon returned, and as the date for it we may take Collins's "Ode on the Popular Superstitions of the Highlands of Scotland" (written in 1749). In 1764 Horace Walpole published the *Castle of Otranto,* which initiated the romance of the ghost and the nightmare. This kind of literature was spiritualized by Coleridge in the "Rime of the Ancient Mariner" (1798). Moreover, the first half of the eighteenth century cared little for the past. On history Fielding was very satirical, declaring that there was more truth in *Tom Jones* than in Lord Clarendon. But with the ghost came history, which was incorporated into romance. Most of these characteristics of romanticism—the love of the picturesque, history, and superstition—found combined expression in Scott, first in his verse tales and afterwards in the Waverley novels. It is, however, to be noted that Scott was rarely lyrical, and that the supernatural awakened in him little of the mystic's awe. For mysticism, which was becoming one of the notes of romanticism, we have to look rather to the neoplatonism of Wordsworth, the pantheism of Shelley, and, for its full development, to the Pre-Raphaelite Brotherhood (see PRE-RAPHAELITES), of which Rossetti was the central figure.

For their matter the romanticists turned to our earlier literature; to Milton, Spenser, Shakespeare, to ballads, metrical romances, Celtic and Norse stories, Greek art and literature, and later to Dante. In this search for what was new they were much aided by scholars. In 1755 P. H. Mallet, a native of Geneva, and professor of belles-lettres at the University in Copenhagen, published the first part of his *Histoire de Danemarck,* of which an English translation by Thomas Percy appeared in 1770. This book first made generally known to England the gist of the Eddas. Five years before Percy had published a collection of English and Scotch ballads under the title of *Reliques of Ancient English Poetry.* This ballad book has been aptly called 'the Bible of the romantic reformation.' Another publication of great influence was Macpherson's *Ossian* (1760-63), a series of prose poems, in which some use was made of Celtic motives. The romanticists also had their advocates in criticism. In 1754 appeared Thomas Warton's *Observations on the Faery Queen of Spenser,* a measured defense of romantic themes. Two years later Joseph Warton published an *Essay on Pope,* one of the most important contributions to romantic criticism. Pope, who had been regarded as the most correct of English poets, Warton placed below Milton and Spenser,

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and added that he was surpassed in some respects by Thomson and Gray. As marking the progress of romantic criticism from timidity to boldness, we should also mention *Letters on Chivalry and Romance* (1762), by Richard Hurd, in which Spenser was placed highest among English poets. The case of romanticism against classicism continued to be argued by many others. For example, W. L. Bowles issued in 1806 a new edition of Pope, which was prefaced by severe strictures. This publication led to a lively controversy, in which Byron took a prominent part on the side of Pope. By this time our old writers and the new romantic school were being interpreted in a sympathetic mood by Lamb and Hazlitt. To such an extent was romanticism thus a revival that literary historians have often defined it as a return to the Middle Ages. But it was no return; its product was unlike anything in the past. Mediæval and other literatures rather furnished it with motives and suggestions for as original work as any period of our literature can claim.

In their study of early poetry the romanticists naturally revived and modified old verse-forms. From the advent of Dryden to the death of Pope the heroic couplet reigned almost supreme. Written with a good deal of freedom at first, it had at length come to be very monotonous, with its fixed cæsuras and pauses at the ends of the lines. Although some of the romanticists held to this couplet, they nevertheless broke it up, varying the cæsuras and letting one line overflow into another or one couplet into another, without any stop whatever. In their first revolt from Pope the new poets, however, often imitated the blank verse and the octosyllables of Milton, the Spenserian stanza, ballad measures, and the Elizabethan sonnet. The movement toward a free versification has continued until to-day English poetry is richer in verse-forms than ever before. The English vocabulary has also been renovated. Into prose romance came, with Scott and his school down to Stevenson, old words and expressions; and the poets have ventured upon new and felicitous compounds. Perhaps the greatest gain to our language from romanticism has been the choice of words for their rich coloring and sounds.

In other countries the course and the results of romanticism were much the same as in England. The French date the beginning of the movement with Rousseau's cry of a return to nature (c.1750), and follow it through Chateaubriand to Victor Hugo and a group of his contemporaries. In her book on Germany (*De l'Allemagne*, 1810) Madame de Staël upheld romantic ideals and described for her classic compatriots the wonders of romantic literature in Germany. In his preface to *Cromwell* (1827) Hugo defended against classicism the grotesque in art, declaring it to be "one of the supreme beauties of the drama," and condemned the unities of time and place. Hugo demanded unrestrained liberty. He and his associates enriched the current literary vocabulary, freed French classic metre from its trammels, and recovered forgotten stanzas.

French romanticism owes a great deal to England, and Shakespeare seems to have been far more often in the thoughts of Hugo and his circle than was Rousseau. Shakespeare exemplified freedom for the drama. *Hernani* (1830) was constructed in the Shakespearean spirit and it aroused more hostility and enthusiasm than any other play by Victor Hugo. The French romanticists sought their inspirations far and near. Searching the literature of other nations, they found new worlds and extended the intellectual boundaries of France. Notwithstanding so much that is maudlin or extravagant in the French romantic period, it is an epoch as remarkable for its vitality, sympathy, and curiosity as the classic seventeenth century was remarkable for its logic and its limitations, both of horizon and of form.

In Germany the first announcement of romanticism was in 1773, when there appeared a collection of essays by Möser, Herder, and Goethe, entitled *Von deutscher Art und Kunst, einige fliegende Blätter* (fly-sheets on German style and art); great praise was bestowed on German folk-songs, Shakespeare, and Gothic architecture. The same year Goethe published *Götz von Berlichingen*, an historical drama, of which the hero is a robber-knight of the sixteenth century. Schiller also felt the romantic impulse at the beginning of his literary career. But Goethe and Schiller soon outlived their youthful extravagances, and in reaction from their classicism in the narrower sense of the term there arose the German romantic school, of which the official organ was the *Athenäum*, founded in 1798 by the Schlegels. Among other romanticists were Tieck and Novalis; and coming later and forming what is sometimes called the second romantic school, were Arnim, Brentano, the Grimms, and Uhland.

Like Chamisso, Heine composed ballads and allowed his mind to wander in a dream world. His poetic landscapes and his poetic incidents are romantic, but Heine had more than one side, and he expressed a great many human conditions without distortion. In the unfinished epic *Tristan und Isolde*, Immermann endeavored to quicken mediæval poetry. Gustav Freytag sought to breathe life into mediæval dust in *Die Ahnen;* Victor von Scheffel succeeded charmingly in his story of *Ekkehard*, and mediæval literature has since been cultivated, translated, and adapted by men like Wilhelm Hertz and Paul Heyse. That romanticism began in Germany, as has so often been asserted, is a theory which does not admit of demonstration. Until a rigid definition of romanticism shall have been accepted by all reputable critics, and until the works of a host of writers shall have been tested with this definition (which must necessarily be derived from the very men to whom it is applied), so long shall we be unable to honor any one country as the home or any one man as the founder of romanticism. Like realism (q.v.) and idealism, romanticism is a tendency, and we can find it not only in a Victor Hugo or a Wordsworth, but in a Cervantes, or in the adventures of Odysseus. Romanticism had its schools, its declarations, and its dogmas. These are more easily found and explained than the features which they impressed upon literature or the causes which gave them rise. In England, France, Germany, in Scandinavia, in Italy, and in Spain, romanticism flourished as something new and extraordinary until its novelty had worn off and its elements had been assimilated by literature.

Romanticism was everywhere—in England, France, Germany, Scandinavia, and Russia—a revolt, either silent or outspoken, from literary tradition of every description. Its boldest cham-

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pions asserted the right of the man of letters to proceed untrammeled, to choose his themes from whatever source might please him and to treat them as he liked; and they further demanded that the product should be judged by itself, irrespective of what somebody else has done. Though no one country can definitely claim the glory of the achievement, it is yet to be observed that the awakening took place earliest in England. In literature the results have been greatest for England and France. Germany's poets of the first rank did not belong, strictly speaking, to either of her romantic schools. On the other hand, from one of the impulses of romanticism—the revival of heroic legend—has come that wider movement which has culminated for Germany in national unity.

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ROMANTIC SCHOOL OF MUSIC. See MUSIC, SCHOOLS OF COMPOSITION.

ROMA'NUS. The name of four Byzantine emperors. ROMANUS I., LECAPENUS, was Emperor from 919 to 944. He was born in Armenia of poor parents. He entered the Imperial fleet, was high admiral on the accession of Constantine VII., Porphyrogenitus, and by intrigue became Augustus in 919. His reign was filled with war; the Bulgarians were bought off in 926 and again a few years after; and in 941 Romanus was victorious over a great Russian fleet under Ingor. In 944 Constantine formed a league with Romanus's two sons, deposed him and forced him into a monastery, where he died after four years (948). Constantine's son, ROMANUS II. (c.939-963), succeeded his father in 959. He lived a life of ease and was poisoned by his wife, Theophano. His granddaughter Zoë was married by her father, Constantine VIII., to ROMANUS III., ARGYRUS (c.968-1034), who was compelled to divorce his first wife and assume the Empire in 1028. With an excellent policy, he was unsuccessful for lack of administrative ability. It is supposed that he was put out of the way by Zoë, who was in love with a general, Michael Paphlago. ROMANUS IV., DIOGENES (?-1071), made frequent attempts to revolt under Constantine Ducas, and after the latter's death was arrested on the charge of plotting against Eudoxia, Constantine's widow, whose passion for him as soon as she saw him rescued Romanus from death and brought him to the throne (1068). After a few years of successful war against the Seljuks, he was defeated by Alp-Arslan (q.v.), and was killed in the same year by a revolutionary party in Constantinople.

ROMAN WALL. The remains of the lines of defense erected by the Romans to protect the northern boundary of Britain. We first hear of such defenses against the tribes of Caledonia, when Agricola built a chain of forts to secure his conquests north of the Clyde. Of these, however, few, if any, traces remain, unless in a fort at Camelon, near Falkirk. Across the narrow neck, about 35 miles in width, between the Firth of Forth and the Firth of Clyde, under the Emperor Antoninus Pius about A.D. 142, was built a rampart of turf, with a broad ditch on the north and a military road on the south. A chain of eighteen forts furnished stations for the garrisons. This line was held for less than fifty years, and then the Romans fell back to a southern line, already established by Hadrian, which crossed the island from the Solway to Newcastle-on-the-Tyne. Here, about A.D. 120, there was a similar turf rampart, protected by a ditch, and having a length of about 80 miles. Nearly ninety years later Septimius Severus seems to have replaced this by a stone wall, which followed in general the same course. This wall is still so far preserved as to be easily traced. South of it, at an irregular distance, ran the *vallum*, which was simply a broad ditch with a low mound on each side. It does not seem to have had a military purpose, but was apparently a boundary mark. South of this was a chain of detached forts, connected by a road, and with castles and watch towers at intervals.

The term Roman Wall is also sometimes applied to the *Limes* or boundary wall or palisade erected by the Romans to mark the frontier between the Rhine and the Danube. This work was really in two sections. One, forming the northern boundary of Rhætia, ran from Hienheim on the Danube, near Regensburg, almost due west to a point near Stuttgart; the other, starting from the Rhine, nearly opposite Rheinbrohl, ran at first southeast, and then turned more to the south until it joined the Rhætian line. At first both were little more than a palisade and ditch, with a second line of wooden towers and fortified camps. Later the line of Upper Germania was defended by an earthen rampart, and that of Rhætia by a stone wall. Stone camps and towers replaced the wooden structures of the second line. Similar forts defended the line of the Danube along Pannonia and Noricum, though here no outer boundary line was needed.

ROMBERG, rôm'bĕrk, ANDREAS (1767-1821). A German violinist and composer, born at Vechta, near Münster. In Paris he was engaged as violin soloist at the Concerts Spirituels and subsequently made several tours. He lived in Hamburg (1801-15), and then succeeded Spohr as Court kapellmeister at Gotha. He wrote eight operas which are unimportant, and many violin concertos, symphonies, and string quartets, several of them of great excellence, but is most famous for his choral and solo works with orchestra, of which the best known are those set to Schiller's poems, as "Die Glocke," "Die Kindesmörderin," and "Monolog der Jungfrau von Orleans."

ROMBLÓN, rôm-blōn'. A group of islands forming a separate province of the Philippine Islands. The group belongs to the Visayas, and

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is situated in the centre of the Visayan Sea east of Mindoro and north of Panay (Map: Philippine Islands, G 7). The principal islands with their areas in square miles are Tablas (320) in the west, Sibuyân (90) in the east, and Romblón (54) in the centre; the total area of the province is 515 square miles. The islands are highly mountainous, with a number of peaks over 2000 feet high in Tablas, while the peak of Sibuyân has a height of 6424 feet. The greater portions are covered with forests containing valuable woods, but wholly unexploited, except that a little gum mastic and copra are exported from the island of Romblón. Cattle are also raised and exported from the latter island, but throughout the province agriculture and other industries are engaged in only to supply the absolute necessities of home consumption. The population in 1901 was 55,339, mostly Visayans, with a few hundred savage Negritos in the interior of Tablas. The capital of the province is Romblón, with a well-sheltered harbor and a population of 6764.

ROME (Lat., It. *Roma*, Gk. Ῥώμη, *Rōmē*, connected with OLat. *roumen*, river Gk. ῥεῖν, *rhein*, Skt. *sru*, to flow), MODERN. The capital of the Kingdom of Italy and of the Province of Rome, the third largest city in the country. The city lies on the plain on each side of the winding Tiber, and in part on the slopes of the historic Seven Hills (Map: Italy, G 6). Its geographical position at the observatory of the Collegio Romano is latitude 41° 53′ 52″ N., longitude 12° 28′ 40″ E. Its situation in the Campagna, about 14 miles from the Apennines on the east, and the same distance from the Mediterranean on the west, is naturally unfavorable to health, but Rome is now considered one of the most sanitary cities in Europe, owing to extensive modern betterments of every description. The death rate fell from 30 per 1000 in 1876 to 26 in 1885, and to less than 18 later. The climate is less extreme than in Florence and Milan, the thermometer seldom rising above 99° F. or falling below 23°. The mean temperature in January is 44°, in July 77°.

Modern Rome, situated on the many-bridged Tiber, and dignified by its many and historic gates, is distinguished by its vast ruins, its remains of ancient walls, its numberless public statues and monuments both new and old, its fountains, and the magnificent improvements which have been made since Italy became a united kingdom. The Tiber has been inclosed in vast embankments of masonry, streets have been widened, filthy districts done away with, and pleasure grounds laid out. The Palatine Hill is now a public park; the Janiculum has been converted into drives and walks; and the Villa Borghese (q.v.) and gardens have been acquired for the metropolis. The historic present wall of the city is for the most part that of Aurelian, dating mainly from about 275. Rome is fortified by a wide circle of detached forts. The circumference of the city is about 15 miles. There are 10 bridges, three of which are for the most part ancient. Of these the five-arched Sant' Angelo is the best known. Many handsome modern public edifices have been erected.

Rome may be described as consisting of four sections or districts: The Campus Martius, the ancient southern portion, the more modern city on the northeast and east, and the district on the right bank. Mediæval Rome grew up not on the Seven Hills, but on the site of the old Campus Martius and across the Tiber around Saint Peter's and the Vatican; and these two districts remain to-day the most densely settled parts of the city. By far the larger of the two, the Campus Martius, occupies all the plain between the walls of Aurelian, the Pincio, Quirinal, and Capitoline hills, and the river. At its northern extremity, where the Porta del Popolo opens through the walls, is the handsome Piazza del Popolo, in the centre of which stands an Egyptian obelisk brought to Rome by Augustus Cæsar from the Temple of the Sun at Heliopolis. The noteworthy Santa Maria del Popolo Church adjoins this Piazza. It was rebuilt at the close of the fifteenth century, and contains many frescoes by Pinturicchio. The Campus Martius district is practically bordered on the west for the most part by the important and historic Corso, which branches out from the Piazza del Popolo and runs south-southeast for about a mile to the Piazza di Venezia near the foot of the Capitoline Hill. It is lined with splendid palaces, churches, ancient and modern, and fine shops, Baroque architecture being in evidence.

The Piazza Venezia takes its name from the adjacent Palazzo di Venezia, a fine Florentine structure of the fifteenth century, built of stones from the Colosseum. In this part of the city the Italian Senate and Chamber of Deputies hold their sessions, and here are found also various Government offices and the University of Rome. The celebrated Pantheon (q.v.), which has always been important in the city's history, is the only ancient building in Rome still practically complete. The splendid Piazza Colonna on the Corso is to the northeast of the Pantheon, and is the centre of modern Roman life. In it rises the fine ancient column of Marcus Aurelius, 95 feet high. Not far away from the square is the elegant Sciarra-Colonna Palace, scarcely surpassed even in Rome. It dates from the early part of the seventeenth century. Two historic piles in the vicinity are the Palace Torlonia and the Palace Bonaparte, where the mother of Napoleon lived and died. Near by is the superb Palace Doria, with its noteworthy collection of paintings. To the east is the equally well-known Colonna Palace, dating from the commencement of the fifteenth century, with a small but good picture gallery having some of the finest landscapes of Poussin. Some distance northwest, near the Tiber, stands the Palace Borghese, with a splendid colonnaded court. To the southwest of this palace is the noteworthy Sant' Agostino Church, dating from 1479, the first church in Rome with a dome. Just southeast of the Pantheon is the Santa Maria sopra Minerva Church, begun in 1285 and fully renovated in recent times. It contains Michelangelo's sublime "Christ and the Cross." West of the Pantheon is the interesting Piazza Navona, with 3 fountains. Near it rises the Santa Maria della Pace Church, due to Sixtus IV. (1484). In one of its chapels are the far-famed Sibyls of Raphael, painted in 1514. Bramante built the fine cloisters. In the district south of the Pantheon is the Gesù, the sumptuous church of the Jesuits, begun in 1568. West of it stands the interesting Sant' Andrea della Valle, dating from 1591. Still farther west rises the imposing Renaissance Palace della Cancelleria, finished in 1495. Its arcaded court is of much interest. Just

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south is a business centre—the Piazza Campo di Fiore, with a fine bronze statue of Bruno, erected in 1889 on the spot where he was burned. To the east stood the Theatre of Pompey, where Cæsar was assassinated. Southwest near the Tiber is the splendid Farnese Palace, completed in 1545. It was constructed, in part, by Michelangelo. Some distance to the east is situated the Piazza Tartaruga, containing the elegant bronze Fountain of the Tortoises, dating from 1585. In this vicinity was also the Ghetto after 1556—a congeries of mean alleys where the Jews were herded together by law under the Papacy. Here also is found the Cenci-Bolognetti Palace, where dwelt the sad-famed Beatrice. Near by is the noteworthy Porticus of Octavia, dating originally from the time of Augustus.

The southern part of the modern city formed the site of ancient Rome. Here are the Palatine, Aventine, and Cælian hills, now covered with celebrated ruins, also parks, gardens, vineyards, and orchards, besides churches and convents. All the region is sparsely inhabited. The top of the Capitoline Hill, approached from the Campus Martius by magnificent staircases at the foot of which Rienzi was slain, is one of the most impressive spots in Rome. The majestic square of the Capitol was planned by Michelangelo. Among its minor objects of interest are: an ancient group of the horse-taming Dioscuri; the celebrated bronze equestrian statue of Marcus Aurelius; and the first milestone of the old Appian Way. The Santa Maria in Aracœli Church, here, contains a famous Holy Child (Bambino). On the north end of the Capitol is seen the elaborate new monument of Victor Emmanuel II. The Palace of the Conservatori (on the Capitoline) contains the New Capitoline Museum. Here are preserved, among antiquities and pictures, many worthy ancient sculptures. Here, too, is to be seen the far-famed Capitoline wolf, probably the one that was struck by lightning (B.C. 65) in the temple. The Capitoline Museum of sculpture is also here. The Palace of the Senators, where is housed the civic administration of the city, has features by Michelangelo. This was the site of the ancient Tabularium. The Tarpeian Rock is on the southeast side of the Capitoline Hill, to the east-southeast of which extends the long site rich with the ruins of the Roman Forum, Colosseum, etc. On the south of the Forum rises the Palatine Hill. The impressive ruins, threaded by the pavement of the ancient Sacra Via, consist mostly of surface constructions. Of the isolated columns standing, those of the temple of Castor and Pollux are the most beautiful. The only construction here remaining practically in perfect condition is the Arch of Septimius Severus, dating from A.D. 203. Farther on toward the Colosseum rise three vast and impressive arches of the ancient Basilica of Constantine, constructed in his period. To the southeast stands the fine Arch of Titus, with reliefs, dedicated A.D. 81. East of the Arch at some little distance away rises the ruin of the magnificent Colosseum. (See AMPHITHEATRE.) It stands in the ancient gardens of Nero's Golden House. Its effect by moonlight and under artificial light is exceptionally grand. Southwest is the splendid Triumphal Arch of Constantine, constructed in 312.

North of the Roman Forum were the magnificent fora of the emperors, scant remains of which now exist. Part of the old Mamertine prison, where Jugurtha and Vercingetorix met their death, is still to be seen under a church in the vicinity. The finest of these fora was the superb Forum of Trajan, unequaled for splendor. In its northwestern part rises the magnificent marble Trajan's Column, with a total height of about 150 feet. Its reliefs contain 2500 human figures. A statue of Saint Peter rises on the summit. Trajan was buried underneath the column.

On the Palatine Hill are the vast ruined surface constructions and substructures of the palaces of the emperors. This was the site of the Roma Quadrata, parts of whose walls are still to be seen. The excavations here, as in the fora, have been very extensive and costly. The chief ruins seen on the hill are those of the Palace of Tiberius; the House of Livia, the wife of Augustus, with unexcelled frescoes, and altogether a most interesting edifice, being a complete Roman house; the mighty Palace of Augustus; the Stadium; and the Pædagogium, or school for the slaves of the emperors. At the western foot of the Palatine is the fine Janus Quadrifrons, a four-faced arched passage. Under this district passes the great ancient Cloaca Maxima (q.v.) from the Forum. It still discharges into the Tiber near by. In the proximity of this emptying point is an attractive little marble circular temple, with 20 Corinthian columns. Close by is another interesting and ancient temple, Ionic in style, now the Church of Santa Maria Egiziaca. To the southeast and along the southwestern foot of the Palatine Hill formerly stretched the immense Circus Maximus. Only its surface construction remains to view.

The adjoining Aventine district in Southern Rome is now covered with monastic institutions and picturesque old gardens. Of the three churches on the crown of the Aventine the Santa Sabina is of the most importance. It dates from A.D. 425, and was the headquarters of Saint Dominic and his brotherhood. Near by is to be had the famous peep-hole view of the dome of Saint Peter. Some distance to the southwest from the Aventine Hill, and in a bend of the Tiber, rises Monte Testaccio, a solitary mound 115 feet high. It is said to have been formed of broken earthen jars, which came chiefly from Africa and were unpacked in the vicinity. To the east and in the vicinity is the well-known Protestant cemetery of Rome, a fine spot with noble trees. Here are buried Shelley, Keats, Trelawney, J. A. Symonds, and John Gibson. Not far away is the ancient Pyramid of Cestius, the tomb of the Prætor Cestius Epulo. It is 116 feet high, and is inclosed with marble slabs. In the section of the city southeast of the Palatine extends the ancient Via Appia, now transformed into a modern street. Along the route the huge ruins of the Baths of Caracalla (q.v.) are soon reached. Farther along are to be seen various old Roman tombs and columbaria, highly interesting as showing ancient burial customs. Especially so is the Columbarium of the Freedmen of Octavia, Nero's wife, with its niches and stucco decorations and colors. North of this region and east-southeast of the Palatine is the district of the Cælian Hill, with its various churches and religious associations, which date from the time of the Apostles. At its western foot is the San Gregorio Magno Church, noted for its rôle in the lives of Saint Gregory and Saint Augustine. In the vicinity is the little Church of Santi Giovanni e Paolo, dating from

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400, and restored in the last half of the nineteenth century. Portions of the early edifices here are worthy of study.

The district north of the Cælian and radiating east from the Colosseum is that of San Clemente and the Lateran. The former basilica, just to the east of the amphitheatre, is of interesting antiquity and handsomely preserved. Underneath are the remains of the original church, dating from the fourth century. This lower church was large and its frescoes are of value. The upper church is also striking. The extensive Saint John in Laterano basilica, with its square and approaches, is very impressive. In the centre of the square stands a red obelisk from Thebes—the largest obelisk in Europe. On the left is the Lateran Museum, occupying the former residential palace of the popes. Opposite the Museum and across the square is the baptistery, the first one in Rome. The interior is decorated with mosaics and frescoes. In the interior of the church itself may be observed an admirable Gothic canopy and mosaics by J. Torriti. The cloisters of the thirteenth century are fine. Just to the northeast of the Lateran is the edifice which contains the well-known Scala Santa and the former chapel of the popes. (See LATERAN, CHURCH OF SAINT JOHN.) The most modern region of Rome, lying northeast and east of the Campus Martius and beyond the Corso, covers the slopes and plateaux of the Pincian, Quirinal, Viminal, and Esquiline hills. Here the city presents the usual appearance of a Continental metropolis. East of and adjoining the Piazza del Popolo rises the beautiful, garden-covered Pincio—the fashionable place for driving in the afternoon. The gardens of Lucullus were here. The grounds are everywhere embellished with statues, etc. The view over Rome is fine. Here is situated the Villa Medici, dating from 1540, in which the French Academy of Art has been housed since 1801. The Piazza di Spagna, the centre of the foreign life in Rome and of the artists' quarter, is near by. To it descends the imposing Scala di Spagna (1725) in 137 steps. Near the royal palace, situated to the southeast, is the grand Fontana Trevi, the most famous fountain in Rome. It dates from 1762. Northeast of the palace is the Piazza Barberini, with Bernini's fine fountain of the Tritons. The Barberini Palace (q.v.) is adjacent. Farther to the northeast stands the Palazzo Piombino, with the Boncompagni Museum of antiques, including the famous Head of Juno—Juno Ludovisi—and other fine examples. This vicinity was occupied by the gardens of Sallust. The neighboring Quirinal Palace, the abode of the King, belongs to the last part of the sixteenth century. Directly south is the interesting Rospigliosi Palace, dating from 1603. In its adjoining casino is the famous "Aurora" of Guido Reni—a ceiling painting.

A long street follows the top of the Quirinal ridge from Monte Cavallo, the square in front of the royal palace (so called from the colossal ancient statues of Castor and Pollux with their horses, Cavalli, that stand here—magnificent specimens), northeast to the Porta Pia in the city walls. This street is called Via del Quirinale in its lower part, then Via Venti Settembre. On it are the Ministries of War and Finance. South of this street and running parallel with it is the Via Nazionale—the most important street of the modern city. All this handsome new region, in fact, is traversed by straight magnificent avenues reaching in all directions. Near its centre are the vast Baths of Diocletian (q.v.), where is located the Santa Maria degli Angeli Church. Southwest is the magnificent modern building of the National Gallery of Modern Art, to the southeast of which stands the Santa Pudenziana, said to be the oldest church in Rome. In the vicinity rises, in a spacious square, the imposing Santa Maria Maggiore (q.v.). To the south of it lay the gardens of Mæcenas, and not far away may be seen remains of the Servian Wall. Quite a distance to the east is the noteworthy pilgrimage church San Lorenzo fuori le Mura, rebuilt in 578. Just south of the Maria Maggiore is the very early Santa Prassede. It was last restored in 1869. To the southwest is San Pietro in Vincoli, founded in the middle of the fifth century, and containing Michelangelo's celebrated Moses. Among the well-known villas in northeastern Rome the Borghese, with its art collections and beautiful grounds, is justly the most famous. The villa dates from the early part of the seventeenth century. The grounds are enriched with statues, fountains, miniature temples, etc. The splendid collections include Titian's far-famed "Sacred and Profane Love."

That part of the modern city of Rome which lies on the right or western bank of the Tiber may be divided into three parts—the Vatican quarter, otherwise called il Borgo, the Trastevere proper, and the Prati di Castello. The Borgo, or Leonine city, inclosed in a wall of its own, extends between Saint Peter's and Sant' Angelo. Sant' Angelo rises at the north end of the bridge of Sant' Angelo, which crosses the Tiber near the western end of the Campus Martius. The Prati lies to the north, and is a modern quarter, largely of apartment houses, uninteresting and ugly. The circular Castle of Sant' Angelo, as the great Sepulchre of Hadrian is called, is surrounded with ramparts, moats, and bastions, mounted with cannon, and is used as the citadel of Rome. It was erected A.D. 136. It is both imposing and picturesque, and has for some fifteen centuries been regarded as the fortress of Rome, figuring prominently in all the mediæval warfare of the city. Its height is 160 feet. When it was in the hands of the popes they connected it with the Vatican by an underground passage. Certain of the apartments are decorated, and the visitor is shown where Cellini and Beatrice Cenci were imprisoned. On the way to the Vatican stands the fine Giraud Palace, dating from 1503. The district of the Borgo has been more or less closely associated with Papal history from the beginning of the sixth century, but is not in itself very interesting. Immediately to the west, on the slopes of the Monte Vaticano, loom the vast and magnificent establishments of Saint Peter's and the Vatican. See the articles SAINT PETER'S CHURCH and VATICAN.

South of Saint Peter's and along the Tiber and the Janiculum (q.v.) range of hills extends the Trastevere—that distinct district of Rome where the handsome work-people claim direct descent from the ancient Romans. It is connected with the Saint Peter's district by the Via della Lungara, which runs close to the river, and by the Strata della Mura along the heights. In the monastery of Sant' Onofrio, in the northern part of the Trastevere, Tasso lived for a time and died. Farther on and near the right is the magnificent

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THE COLOSSEUM

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Villa Farnesina with its gardens. It has decorations designed by Raphael and executed by Giulio Romano and others. Twelve of these decorations form the Myth of Psyche—of rarest value. The villa also contains Raphael's unsurpassed Galatea, executed by himself. Opposite, on the west, is the Palace Corsini with fine gardens. Near by is the Museum Torlonia with a vast collection of antiquities. Some distance southeast of the Museum Torlonia, and on the elevation, is the well-known Church of Santa Maria in Trastevere, alleged to have been founded under Alexander Severus. It has been restored in later times. Farther on to the southeast is the noteworthy Santa Cecilia in Trastevere, where the home of the saint was, and where now her remains lie. From the top of the Janiculum, along which run fine drives, especially the beautiful modern Passeggiata Margherita through the former gardens of the Palace Corsini, may be had splendid views of Rome. Especially in the late afternoon, when the sun is casting its waning glow over the Imperial city below, is the scene marvelous—the countless domes, towers, colossal piles, and vast ruins—all set off by the magnificent line of the Alban Mountains, usually snow-capped, in the distant background. On the Janiculum, and west of the Trastevere Church, is the Church of San Pietro in Montorio, marking the place where it is claimed Saint Peter was martyred. In the grounds of its monastery is a little round Doric tempietto, a fine example designed by Bramante. It is situated on the precise spot where Saint Peter's cross is supposed to have stood. The superb view over Rome from the piazza of this church is the usual one enjoyed on the Janiculum by tourists. Some distance to the west is the fine Villa Doria Pamphili, with large and delightful grounds.

Rome is not important as an industrial and commercial centre. The art manufactures are, however, prominent, and consist in part of bronzes, terra-cottas, mosaics, cameos, artificial pearls, and church ornaments. Other manufactures are leather, silk, umbrellas and parasols, strings for musical instruments, artificial flowers, candles, soap, flour, macaroni, fertilizers, and glue. A flourishing industry is the making of copies of famous paintings. In the Vatican is the Papal manufactory of mosaic, where copies of famous pictures are executed in colored glass for churches and other religious institutions. The Government has a large tobacco factory in Rome. The largest imports are grains, cattle, and wine. The Tiber is canalized in the city, but its port only suffices for small river craft.

Rome is the seat of the Italian Government and of the Pope and the College of Cardinals. The head of the municipal government is the syndic or mayor. He is chosen by the 80 members of the municipal council, who are themselves elected by the people. The giunta is an administrative body, consisting of the mayor and 10 members (assessori), who preside over the departmental committees. For purposes of administration the city is divided into 15 districts. It forms five parliamentary circles. In 1902 the budget balanced at about $6,500,000. The debt of the city in 1903 was some $43,900,000. The streets are lighted principally by electricity. There are electric street railways and a fire department. There are also municipal markets and baths, and a municipal slaughter house, bakery, cemetery, crematory, and pawn shop. Rome is unequaled perhaps for its fine and abundant water supply, which is conducted from the mountains into the city by four great conduits, which employ in part the half-ruined aqueducts of old Rome, that stalk so majestically across the Campagna. The building regulations of Rome, adopted in 1887, are exceedingly strict. They make ample provision for light and air and have had a marked effect upon the kind of tenement and other houses erected. They forbid the destruction, even by the owners, of buildings of historic or artistic interest, but encourage the tearing down of other antiquated dwellings. The desire of the Government not to sacrifice the monuments of antiquity was clearly shown by the project to acquire and set apart as an archæological park the district containing the Forum, the Colosseum, the Forum of Trajan, the Baths of Titus, the Circus Maximus, the temples of Vesta and of Fortuna, and the remains of the palaces of the Cæsars on the Palatine.

The interesting features in the environs (see CAMPAGNA DI ROMA) not already mentioned are: The Villa Albani, on the northeast, with an interesting art collection, including some well-known examples; farther on, the Sant' Agnese fuori le Mura Church, built over the tomb of the saint, and restored in 1856; the various Catacombs (q.v.); the Appian Way (q.v.), on which is the Domine quo Vadis (q.v.) Church, southeast of the city; farther on, the interesting Circus of Maxentius and the well-known tomb of Cæcilia Metella (q.v.); and the San Paolo fuori le Mura Church, south of the city. This church was called the most attractive one in Rome before the fire of 1823. It has been rebuilt in splendid style, with a particularly gorgeous interior. It contains a series of portrait medallions of all the popes. The cloisters are also fine.

Under the monarchy the Roman educational system has been thoroughly reorganized. Besides the University (see ROME, UNIVERSITY OF), there are the College of the Propaganda, founded in 1627, with theological and philosophical faculties; the Pontificia Accademia dei Nobili Ecclesiastici, for the preparation for administrative and diplomatic careers; the Collegio Germanico-Ungarico; the Jesuit Collegio Romano; a Collegio Rabbinico; an Institute Talmud-Tora; a Collegium Bohemicum; two Collegii Teutonici; a Conservatory of Music; a School of Architecture and the Plastic Arts; four municipal licei; four public ginnasi, etc. Among the numerous academies and art and science institutes and associations are the Accademia degli Arcadi; the Royal Academy of Sciences; the Società di Belle Arti. Nearly all the leading countries are represented by schools, including the American Schools of Architecture and of Classical Studies. The botanic garden is of some interest.

The museums of Rome are vast and invaluable, especially the art and archæological collections. They have been in part noted above in *General Description*. (For the Vatican collections, see VATICAN; for the Capitoline collection, see CAPITOLINE MUSEUM.) The Capitoline Museum contains the beautiful Capitoline Venus and the famous mosaic (Pliny's) Doves on a Fountain Basin, brought from Hadrian's Villa. The museum of the Lateran possesses the fine portrait-statue of Sophocles, discovered in 1838. Among

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the masterpieces in the National Roman Museum of Antiquities are a statue of Hera and a marble statue of a Kneeling Youth—the latter an original Greek work. The National Corsini Gallery, with engravings and drawings, is likewise meritorious. The Collegio Romano contains the important Museo Kircheriano, founded in 1601, with its extensive pre-historic and ethnographical collections. Here is preserved the treasure of Præneste—gold, silver, and other objects discovered in a tomb in 1876.

Rome is rich in libraries. Among the important collections are the Biblioteca Nazionale Centrale Vittorio Emmanuele, with about 340,000 volumes; the great Vatican library, containing 250,000 volumes and 26,000 manuscripts; the excellent medical Biblioteca Lancisiana; the library in the Corsini Palace, with about 70,000 volumes; the library in the Barberini Palace; the Government's Biblioteca Casanatense (182,000 volumes); the Biblioteca Angelica (150,000 volumes). The valuable national archives are housed in the cloisters of the Santa Maria di Campo Marzio. Except Milan, Rome is the most important city in Italy for music and the drama.

The charitable activities, both civic and Catholic, are on a large scale. The 300 organizations under the control of the Board of Charities have property to the value of some $20,000,000. Of these organizations 150 give *dots* to marriageable young women, 11 have other special aims, 55 disperse general charity, the rest are hospitals and asylums. Near the Lateran is an important hospital for women, with an obstetrical clinic. The large hospital of San Michele has a Government working school for children.

Popular festivals of interest are the carnival from the second Sunday before Ash Wednesday to Shrove Tuesday, the October festival in the vintage season, the national festival of the Constitution on the first Sunday in June, and the anniversary of the foundation of Rome on April 21.

The population of Rome in 1881 was 300,467; in 1901, 462.783.

Ancient Rome. The first of the ancient city settlements was upon the Palatine Hill (*mons Palatinus* or *Palatium*), an isolated summit, rising only about 140 feet above the level of the Tiber, and at that time flanked on two sides by marshy pools connected with that river. This first settlement was called *Roma Quadrata*, being laid out four-square, after the Etruscan rite. The next noteworthy stage in the topographical and political development of the city was that of the inclusion of the neighboring hills (*montes*), Cælius and Esquilinus, within the city limits, and the organization of the territory as 'seven hill districts' (the *Septimontium*—not to be confused with the so-called 'seven hills of Rome' of later days). Three of the seven districts were connected with the Palatine—Palatium, Cermalus (the western corner and slope of the Palatine), and Velia (the outlying ridge running northward toward the Esquiline). Three were connected with the Esquiline—Cispius (its northern summit), Oppius (its southern summit), and Fagutal (a western shoulder of Oppius). The seventh district was the Sucusa on the Cælian Hill, whose especial duty it was to lend its aid against attacks by the people of Gabii, who dwelt a few miles eastward from Rome. Later a body of Sabines pushed southward from their hill dwellings, seized a well-defended position on the Quirinal Hill, and had more or less fighting with their Latin neighbors of the Septimontium until a coalition was finally effected and the heights of the Quirinal and Viminal hills, with the Sabine settlers, were incorporated within the city, which was now organized into four 'regions;' (1) *Regio Sucusana* (later called *Regio Suburana*), which included the Cælian Hill, with the valley and rising ground northwestward around the Cispius, as well as the valley (*Subura*) between the *montes* and *colles;* (2) *Regio Esquilina*, including substantially the three Esquiline districts of the *Septimontium;* (3) *Regio Collina*, including the two Sabine *colles*, Quirinal and Viminal; and finally (4) *Regio Palatina*, including the three Palatine districts of the *Septimontium*. Moreover, another *mons*, the Capitoline, at that time joined by a ridge to the Quirinal, but lying near the Tiber, just across the inlet of the Velabrum from the Palatine, was taken as the common citadel of the community and a common temple to Jupiter built upon it, while the valley between the Capitoline and the north corner of the Palatine, just free from the Velabrum inlet at low water, but crossed by a brook, with a number of tributary springs, that rose in the Subura, and subject for centuries (and even now) to frequent inundations from the rising Tiber, was gradually drained and made the common marketplace (*Forum*) of the community, and the meeting-place of its courts and legislative assemblies. King Servius Tullius was said to have added to the city of the Four Regions a triangular strip of plain behind the Esquiline and to have built a wall which included not only the Four Regions, with the Capitol and Forum, and the new addition to the Esquiline, but also another hill (*mons*), the Aventine, lying to the south and west of the Palatine and close to the Tiber. But this hill remained for centuries outside the formal city limits (*pomœrium*), the advancement of which from these really prehistoric times did not keep progress with the growth of the actual settlement. About this time also a wooden bridge supported on piles was thrown across the Tiber from the open space (*Forum Boarium*) between Capitol, Palatine, and Aventine, and a fort constructed on the height of Mons Janiculus on the right bank, whence a constant watch was kept for warlike movements on the part of Rome's enemies, especially the Etruscans.

Although the *pomœrium* was not extended, Rome went on adding new territory in the neighborhood to her domain, and its organization as 'regions' was replaced by an organization as 'tribes,' of which the first four, the 'city tribes,' were simply the old 'Four Regions.' To these new 'country tribes' were gradually added until the number of 35 was reached. But these tribes finally lost their territorial character and became mere voting classes, to one or the other of which each new Roman citizen was assigned. The population of the city was probably much reduced by the Gallic invasion and the haphazard rebuilding of the city after its destruction by that enemy left it with those narrow and crooked streets that were its curse for many centuries. But with the cessation of hostilities in the immediate neighborhood the agricultural population of Rome spread far beyond its walls on both sides of the Tiber, which was now crossed by two new bridges

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of stone besides the old pile bridge. By the end of the Republic the old Servian walls had been overrun in almost all directions and had even disappeared from view in great measure. The best opportunity for building was out on the *Campus Martius*, the 'parade ground,' which lay between the Quirinal and Capitol to the east and the great bend of the Tiber to the west. Accordingly that became the site both of many private residences and of great public buildings of various sorts. Augustus divided the city for administrative purposes into 14 numbered 'regions,' of which 13 were on the right bank and the fourteenth on the left, and this division continued for centuries after his day. But the external limits of his city are difficult, if not impossible, to determine. They, however, extended beyond the later walls of the city in some directions. The population of the city reached its maximum in the early Empire, though the oft-quoted estimate of 2,000,000 is undoubtedly much too great.

Rome had remained a defenseless city for centuries until the Emperor Aurelian (A.D. 270-275) began and Probus (A.D. 276-281) finished a line of massive fortifications, which, restored in 403 by Honorius and later by Belisarius and by a number of the popes, and added to on the right bank by Leo IV. (847-855) to include the great settlement around and near the Basilica of Saint Peter and the Vatican Palace, remain the present walls of Rome. The walls of Aurelian doubtless aimed to include as far as possible the actually inhabited city, but were curiously irregular in outline, being carried, where possible, along the edges of elevations for additional inaccessibility from the outside and also making use of older structures as far as possible. On the right bank, however, the fort on the Janiculum was connected with the Tiber by two lines of wall running northeast and southeast respectively to the nearest points of the river by about the shortest practicable route.

The internal commotions of Italy in the centuries immediately following and the devastation of the region by the barbarian invasions caused a great diminution in the number of Rome's inhabitants, and the cutting of the aqueducts led to the necessary abandonment of residences on the higher ground and to the massing of the people, poor and powerful alike, upon the ground near the Tiber. So the Campus Martius and the Trastevere opposite became the centre of population through the Middle Ages (and are still the most thickly settled portions of the city), while three-fourths of the city was given over to desolation and finally became the vineyards and gardens of the wealthy classes.

History of Rome During the Earliest or Regal Period. According to the myth of Romulus (q.v.), Rome was an offshoot from Alba Longa, but the most rational view of the city's origin is that which is suggested by a consideration of its site. It derived its name from *rumon*, an old word for river—the 'River City;' and it probably sprang into existence as a frontier defense against the Etruscans, and as an emporium for the river traffic of the country; but whether it was founded by a Latin confederacy or by an individual chief is beyond the reach of conjecture. The date fixed upon for the commencement of the city by the formation of the *Pomœrium*, April 21, 753 B.C., is perfectly valueless. The three 'tribes,' Ramnes, Ties, and Luceres, which appear in the Romuleian legend as the constituent parts of the primitive commonwealth, suggest the idea that Rome arose out of an amalgamation of three separate cantons. The existence of a Sabine element, represented by the Ties, is indeed admitted; but its introduction is thrown back to a period long anterior to the foundation of the city, when the Roman clans were still living in their open villages, and nothing of Rome existed but its 'stronghold' on the Palatine. Nor is there anything to indicate that it materially affected the Latin character or the language, polity, or religion of the commonwealth which was subsequently formed.

The motives which probably led to the building of Rome also led to its rapid development. That the Palatine Hill was the oldest portion of the city is attested by a variety of circumstances. Not only does it hold that rank in the Romuleian legend, but on it were situated the oldest civil and religious institutions. The Romuleian myth of the establishment of an asylum on the Capitoline (see Capitol), for homicides and runaway slaves, with its sequels—the rape of the Sabine women, the wars with the Latins of Cænina, Antemnæ, and Crustumerium, and especially with the Sabines of Cures under their King Titus Tatius, and the tragic fate of Tarpeia—is historically worthless; except, perhaps, so far as it shows us how from the beginning the Roman burghers were engaged in constant feuds with their neighbors for the aggrandizement of their power. The entire history of the 'regal period,' in fact, has come down to us in so mythical and legendary a form, that we cannot feel absolutely certain of the reality of a single incident. That such personages as Numa Pompilius, Tullus Hostilius, Ancus Martius, Lucius Tarquinius Priscus, Servius Tullius, and Lucius Tarquinius Superbus ever existed, or, if they did, that the circumstances of their lives, their institutions, their conquests, their reforms, were as the ancient narrative describes them, are things which no critical scholar can believe. The destruction of the city records by the Gauls, when they captured and burned Rome in the fourth century B.C., deprived the subsequent chroniclers of authentic information in regard to the past, and forced them to rely upon treacherous reminiscences, on oral tradition, on ballads, and on all the multifarious fabrications of a patriotic fancy, that would naturally seek compensation for political disaster in the splendor with which it would invest its primeval history of the State.

From the very beginning of the city—and probably long before—the inhabitants were divided into two orders (exclusive of 'slaves'), householders and their dependents, better known, perhaps, as 'patricians' and 'clients.' The former alone possessed political rights. It was they who exclusively constituted the *populus* ('the people'); while the clients had no political existence whatever. That the clients formed a body essentially different from the *plebs* is not true, and seems based merely on the mythical account of what followed the destruction of Alba Longa by Tullus Hostilius. The name plebs is doubtless of later origin than *clientes;* but both are applicable to the same persons. The constitution of the State was simple. All the burgesses were politically on a footing of equality. From their own ranks was chosen the King (*rex*), who was therefore

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nothing more than an ordinary burgess—a husbandman, a trader, a warrior, set over his fellows. The *rex* held his office for life; he consulted the national gods; he appointed the priests and priestesses; he called out the *populus* for war, and led the army in person; his command (*imperium*) was not to be gainsaid, on which account, on all official occasions, he was preceded by 'messengers' or 'summoners' bearing the 'fasces' (axes and rods tied up together), the symbols of power and punishment; he had the keys of the public chest, and he was supreme judge in all civil and criminal suits. The Roman religion or *cultus* was from the first thoroughly subordinate to the authority of the State; and all that we can infer from the myth of Numa is that Rome perhaps owed its colleges of augurs and pontiffs to the wisdom of some enlightened sovereign who felt himself at times embarrassed in his decisions on matters of religious and public law, and recognized how valuable might be the aid afforded him by a body of sacred experts. Originally the sole power was the regal, and the subordinate magistracies of later times arose from a delegation of regal authority, rendered necessary by the ceaseless increase of State business. On the other hand, we may believe that the *senatus*, or council of the elders, from its very nature, was as old an institution as the monarchy itself. They gave their advice when the *rex* chose to ask it; that was all. Yet, as the tenure of their office was for life, they necessarily possessed great moral authority. Then households formed a *gens* (a 'clan' or 'family'); 10 clans, or 100 households, formed a *curia*, or wardship; and 10 wardships, or 100 clans, or 1000 households, formed the *populus*, *civitas*, or community. But as Rome comprised three cantons, the actual number of wards was 30, of clans 300, and of households 3000. Every household had to furnish one foot-soldier, and every clan a horseman and a senator. Each ward was under the care of a special warden (*curio*), had a priest of its own (the *flamen curialis*), and celebrated its own festivals. None but burgesses could bear arms in defense of the State. The original Roman army, or *legio*, was composed of three 'hundreds' (*centuriæ*) of horsemen, under their divisional leaders (*tribuni celerum*); and three 'thousands' of footmen, also under divisional leaders (*tribuni militum*), to whom were added a number of light-armed skirmishers (*velites*), especially 'archers' (*arquites*). The *rex* was usually the general, but as the cavalry force had a colonel of its own (*magister equitum*), it is probable that he placed himself at the head of the infantry.

The foreign policy of Rome seems to have been aggressive from the first, and this character it retained as long as the aggrandizement of the State was possible. We have, it is true, no certain knowledge of the primitive struggles, but it appears from the legends that at a very early period the neighboring Latin communities of Antemnæ, Crustumerium, Ficulnea, Medullia, Cænina, Corniculum, Cameria, and Collatia were subjugated. The crisis of the Latin war, however, was undoubtedly the contest with Alba Longa, which was destroyed and yielded its leadership to the conqueror, its inhabitants being transferred to Rome, where they were ultimately incorporated with the Roman burgesses. The wars with the Etruscans of Fidenæ and Veii—assigned, like the destruction of Alba Longa, to the reign of Tullus Hostilius—were apparently indecisive; those with the Rutuli and Volsci, however, were probably more fortunate; but uncertainty hangs like a thick mist over the ancient narrative. Even the story of the Tarquins, though it belongs to the later period of the monarchy, is in many of its details far from credible.

Meanwhile a great internal change had taken place in Rome. This is usually designated the Servian 'reform of the constitution,' although it was only a reform in the mode of raising the army. Originally, as we have seen, none but burgesses could bear arms in defense of the State; but the increase of the general population, caused partly by the annexation of the conquered Latin communities and partly by time, had totally altered the relation in which the non-burgesses, or *plebs*, originally stood to their political superiors. The *plebs* could acquire property and wealth, and could bequeath it with the same legal right as the *populus;* moreover, such of the Latin settlers as were wealthy and distinguished in their own communities did not cease to be so when they were amalgamated with the Roman 'multitude.' It was therefore felt to be no longer judicious to let the military burdens fall exclusively upon the old burgesses while the rights of property were equally shared by the non-burgesses. Hence the new arrangement, known in Roman history as the formation of the *comitia centuriata*. When or with whom the change originated it is impossible to say. The legend assigns it to Servius Tullius, predecessor of Tarquin the Proud; and it was in all probability the work of some kingly ruler who saw the necessity of reorganizing the national forces. Its details were briefly as follows: Every Roman freeholder from the age of 17 to 60, whether patrician or plebeian, was made liable to serve in the army; but he took his place according to the amount of his property. The freeholders were distributed into five *classes*, and these *classes*, all of whom were infantry, were again subdivided into *centuriæ* ('hundreds'). The first class, which required to possess property valued at 100,000 *asses* ('units'), or an entire 'hide' of land (that is, as much as could be worked with one plow), furnished 82 'hundreds;' the second, property valued at 75,000 *asses* or $\frac{3}{4}$ of a 'hide' of land, furnished 20 'hundreds'; the third, property valued at 50,000 *asses*, or $\frac{1}{2}$ 'hide' of land, furnished 20 'hundreds'; the fourth, property valued at 25,000 *asses*, or $\frac{1}{4}$ 'hide' of land, furnished 20 'hundreds'; and the fifth, property valued at 12,500 *asses*, or $\frac{1}{8}$ 'hide' of land, furnished 32 'hundreds.' These valuations in *asses* are given, it must be noted, by later writers in terms of their own period. There was no such wealth in private hands in Rome during the kingly period. A single 'hundred' was, moreover, added from the ranks of the non-freeholders, or *proletarii*, although it is possible that from the same order came the two 'hundreds' of 'horn-blowers' (*cornicines*) and 'trumpeters' (*tibicines*), attached to the fifth class. Thus the infantry 'hundreds' amounted to 175, that is 17,500 men, besides whom were 18 'hundreds' of *equites* ('horsemen') chosen from the wealthiest burgesses and non-burgesses; so that the Roman army now numbered in all nearly 20,000 men. We have stated that the original design of this new arrangement was merely military, but it is easy to see that it would soon produce political results. Hence

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the Servian military reform paved the way for the great political struggle between the patricians and the plebeians, which commenced with the first year of the Republic, and only terminated with its dissolution.

THE ROMAN REPUBLIC FROM ITS INSTITUTION TO THE ABOLITION OF THE DECEMVIRATE—(1) INTERNAL HISTORY. According to the legend, the expulsion of the Tarquins was brought about by Junius Brutus and Tarquinius Collatinus, in revenge for the outrage on the honor of Lucretia, and was followed by the abolition of the monarchy. The date usually assigned to this event is B.C. 509. The story may safely be taken as evidence that it was an unbridled lust of power and self-gratification that brought ruin on the Romano-Tuscan dynasty. Of course, we can make nothing definite out of the early years of the Republic. Dates and names, and even events, must go for very little. Valerius Publicola or Poplicola, Sp. Lucretius, M. Horatius, Lars Porsena (q.v). of Clusium, Aulus Postumius, with the stories of Horatius Cocles and the battle of Lake Regillus, will not bear historical investigation. We must content ourselves with the knowledge of tendencies and general results. The change from 'kings' to 'consuls' was not intended to diminish the administrative power of the supreme rulers, but only to deprive them of the opportunity of doing harm; and this it effectually succeeded in doing, by limiting their tenure of office to a year, and by numerous other restrictions. (See CONSUL.) It is believed to have been about this time, and in consequence of the new political changes, that the old assessors of the King, such as the *quæstores parricidii*, formally became standing magistrates instead of mere honorary counselors, and also that the priesthood became a more self-governing and exclusive body. During the regal period the priests were appointed by the King, but now the colleges of augurs and pontiffs began to fill up the vacancies in their ranks themselves, while the vestals and separate *flamines* were nominated by the pontifical college, which chose a president (*pontifex maximus*) for the purpose. The opinions of the augurs and pontiffs became more and more legally binding. This is to be connected with the fact that in every possible way the patricians or old burgesses—now rapidly becoming a mere *noblesse*—were seeking to rise on the ruins of the monarchy and to preserve separate institutions for the benefit of their own order, when they could with difficulty longer exclude the *plebs* from participation in common civic privileges. In the details given us of the 'Servian reform' we can easily discern a spirit of compromise, the concessions made to the plebeians in the constitution and powers of the *comitia centuriata* being partially counterbalanced by the new powers conferred on the old burgess body, the *comitia curiata*—viz. the right of confirming or rejecting the measures passed in the lower assembly. The character of the senate altered under the action of the same influences. Although it never had been formally a patrician body—although admission to it under the kings was obtainable simply by the exercise of the royal prerogative—yet practically 299 out of the 300 senators had always been patricians; but after the institution of the Republic, we are told that the blanks in the senate were filled up *en masse* from the ranks of the plebeians, so that of the 300 members less than half were *patres* ('full burgesses'), while 164 were *conscripti* ('added to the roll'), whence the official designation of the senators *patres* [*et*] *conscripti* ('full burgesses and enrolled').

As yet, however, it is to be observed, the plebeians were rigorously excluded from the magistracies. They could vote, but they had no share in the administration. None but patricians were eligible for the consulship, for the office of quæstor, or for any other executive function, while the priestly colleges rigidly closed their doors against the new burgesses. The struggle, therefore, between the two orders went on with ever-increasing violence. One point comes out very clearly from the narrative, that the establishment of the Republic and the reconstitution of the burgess body, instead of allaying discontent, only fostered it. Power virtually passed into the hands of the capitalists, and, though some of these were plebeians, yet they would seem to have preferred their personal money interests to the interests of their order, and to have coöperated with the patricians. The abuse by these capitalists of the *ager publicus*—the lands of a conquered people taken from them, annexed to the Roman State, and let out originally to the patricians at a fixed rent (see AGRARIAN LAW)—together with the frightful severity of the law of debtor and creditor, the effect of which was all but to ruin the small plebeian 'farmers,' who constituted perhaps the most numerous section of the burgesses, finally led to a great revolt of the plebs, known as the 'secession to the sacred hill,' the date assigned to which is B.C 494. On that occasion the plebeian farmer-soldiers, who had just returned from a campaign against the Volscians, marched in military order out of Rome, under their plebeian officers, to a mount near the confluence of the Anio with the Tiber, and threatened to found there a new city if the patricians did not grant them magistrates from their own order; the result was the institution of the famous plebeian tribunate—a sort of rival power to the patrician consulate. To the same period belong the ædiles (q.v.). A little later, the *comitia tributa* emerged into political prominence. This was really the same body of burgesses as formed the *comitia centuriata*, but with the important difference that the number of votes was not in proportion to a property classification. The poor plebeian was on a footing of equality with the rich patrician; each gave his vote, and nothing more. Hence, the *comitia tributa* virtually became a plebeian assembly, and when the *plebiscita* ('resolutions of the plebs' carried at these *comitia*) acquired (by the Valerian laws passed after the abolition of the decemvirate) a legally binding character, the victory of the 'multitude' in the sphere of legislation was complete. From this time the term *populus* practically, though not formally, loses its exclusive significance; and when we speak of the Roman citizens, we mean indifferently patricians and plebeians. The semi-historical traditions of this period unmistakably show that the institution of the tribunate led to something very like a civil war between the two orders. Such is the real significance of the legends of Gaius Marcius, surnamed *Coriolanus* (q.v.); the surprise of the Capitol by the Sabine marauder, Appius Herdonius, at the head of a motley force of political outlaws, refugees, and slaves; the migrations of numerous Roman bur-

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gesses with their families to more peaceful communities; the street fights; the assassinations of plebeian magistrates; the annihilation by the Etruscans of the Fabian *gens*, who had left Rome to escape the vengeance of their order for having passed over to the side of the plebeians; and the atrocious judicial murder of Spurius Cassius, an eminent patrician, who had also incurred the deadly hatred of his order, by proposing an agrarian law that would have checked the pernicious prosperity of the capitalists and overgrown landholders. Finally, B.C. 462, a measure was brought forward by the tribune C. Terentilius Harsa, to appoint a commission of ten men to draw up a code of laws for the purpose of protecting the plebeians against the arbitrary decisions of the patrician magistrates. The ten years that followed were literally a period of organized anarchy in Rome. At length the nobles gave way, and the result was the drawing up of the famous code known as the *Twelve Tables*—at first *Ten*, to which two were afterward added—the appointment of the decemviri (q.v.), and the abolition of all the ordinary magistrates, both patrician and plebeian. The government by decemvirs, however, lasted only two years; according to tradition, the occasion of its overthrow was the attempt of the principal decemvir, Appius Claudius (q.v.), to seize the daughter of Virginius, a Roman centurion; but the real cause was doubtless political, and the result was the restoration of the predecemviral state of things—the patrician consulate and the plebeian tribunal.

(2) External History. The external history of Rome, from the establishment of the Republic to the abolition of the decemvirate, is purely military. Long before the close of the regal period the Romans had acquired the leadership of Latium, and in all the early wars of the Republic they were assisted by their allies and kinsmen, sometimes also by other nations—as, for example, the Hernicans, between whom and the Romans and Latins a league was formed by Spurius Cassius in the beginning of the fifth century B.C. The most important of these wars were those with the southern Etruscans, especially the Veientines, in which, however, the Romans were unsuccessful, and even suffered terrible disasters, of which the legend concerning the destruction of the Fabian gens on the Cremera (B.C. 477) may be taken as a distorted representation; the contemporaneous wars with the Volscians, in which Coriolanus is the most distinguished figure; and those with the Æqui, to which belongs the legend of Cincinnatus (q.v.).

From the Abolition of the Decemvirate to the Defeat of the Samnites, and the Subjugation of All Italy (B.C. 449-265)—(1) Internal History. The leading political features of this period are the equalization of the two orders, and the growth of the new aristocracy of capitalists. After the abolition of the decemvirate, it would seem that the whole of the plebeian aristocracy, senators and capitalists, combined with the 'masses' of their order to make a series of grand attacks on the privileges of the old Roman *noblesse*. The struggle lasted for 100 years, and ended by the removal of all the social and political disabilities under which the plebeians had labored. First in B.C. 445, only four years after the fall of the decemvirs, was carried the *lex Canuleia*, by which it was enacted that marriage between a patrician and a plebeian should be legally valid. At the same time a compromise was effected with respect to the consulship. Instead of two patrician consuls, it was agreed that the supreme power should be intrusted to new officers termed 'military tribunes with consular power,' who might be chosen equally from the patricians or plebeians. Ten years later (B.C. 435) the patricians tried to render the new office of less consequence by the transference of several of the functions hitherto exercised by consuls to two special patrician officers named *censors* (q.v.). In B.C. 421 the quæstorship (see Quæstor) was thrown open to the plebeians; in 368 the mastership of the horse; in 356, the dictatorship (see Dictator); in 351, the censorship; in 337, the prætorship (see Prætor); and in 300, the pontifical and augurial colleges.

The only effect of these political changes was to increase the power of the rich plebeians; and consequently, the social distress continued to show itself as before. Efforts were repeatedly made by individuals to remedy the evil, but without success. Such were the attempts of the tribunes Spurius Mæcilius and Spurius Metilius (B.C. 417) to revive the agrarian law of Spurius Cassius; and of the patrician Marcus Manlius, who, though he had saved the Capitol during the Gallic siege, was hurled from the Tarpeian Rock (B.C. 384), on a trumped-up charge of aspiring to the monarchy; but at length (B.C. 367), after a struggle of eleven years, the Licinian rogations (see Agrarian Law and Licinian Rogations) were carried, by means of which it was hoped that an end had been put to the disastrous dissensions of the orders. Thus, at least, we interpret the act of the dictator Camillus, who erected a temple to the goddess Concordia, at the foot of the Capitol.

That these laws operated beneficially on the plebeian farmers or middle class of the Roman State is unquestionable; but events proved that they were inadequate to remedy the evil, and after a time they ceased to be strictly enforced. On the other hand, there can be as little doubt that, owing partly to these changes, and still more to the splendid and far-reaching conquests achieved in Italy during this period of internal strife by the Roman arms, the position of the plebeian farmer was decidedly raised. Not only was the treasury filled by the revenue drawn directly or indirectly from the subjugated lands, but the numerous colonies which Rome now began to send forth to secure her new acquisitions consisted entirely of the poorer plebeians, who always received a portion of the land in the district where they were settled. The long struggle between the two orders was thus virtually at an end; but the date usually assigned to the termination of the strife is B.C. 286, when the *lex Hortensia* was passed which confirmed the Publilian laws of 339, and definitely gave to the *plebiscita* passed the comitia of the tribes the full power of laws binding on the whole nation. Gradually, however, the importance of the popular assemblies declined, and that of the senate rose. This was owing mainly to the ever-increasing magnitude of the Roman State, and to the consequent necessity of a powerful governing body. The senate, which originally possessed no administrative power at all, now commenced to extend its functions, so that every matter of general importance—war, peace, alliances, the founding of colonies, the assignation of lands, building, the

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whole system of finance—came under its supervision and authority.

(2) External History. The military successes of Rome during this period of internal strife were great. The irruption of the Gauls into sub-Apennine Italy (B.C. 391), though accompanied by frightful devastations, was barren of results, and did not materially affect the progress of Roman conquest. No doubt the battle on the Allia and the capture and burning of Rome (B.C. 390) were great disasters, but the injury was temporary. The vigilance of Manlius saved the Capitol, and the heroism of Camillus revived the courage and spirit of the citizens. Again and again in the course of the fourth century B.C. the Gallic hordes repeated their incursions into Central Italy, but never again returned victorious. In B.C. 367 Camillus defeated them at the Alban hills; in 360 they were routed at the Colline gate; in 358, by the dictator C. Sulpicius Peticus; and in 350, by Lucius Furius Camillus. Meanwhile, aided by their allies, the Latins and the Hernicans, the Romans carried on the long and desperate struggle with the Æquians, Volscians, and Etruscans. Finally, after repeated defeats, the Romans triumphed, and the fall of Veii (q.v.), B.C. 396, was really the death knell of Etruscan independence. Falerii, Capena, and Volsinii—all sovereign cities of Etruria—hastened to make peace, and by the middle of the fourth century B.C., the whole of Southern Etruria had submitted to the supremacy of Rome, was kept in check by Roman garrisons, and denationalized by the influx of Roman colonists. In the land of the Volsci, likewise, a series of Roman fortresses were erected to overawe the native inhabitants; Velitræ, on the borders of Latium, as far back as B.C. 492, Suessa Pometia (B.C. 442), Circeii (B.C. 393), Satricum (B.C 385). and Setia (B.C. 382); besides, the whole Volscian district, known as the Pontine Marshes (q.v.), was distributed into farm allotments among the plebeian soldiery. Becoming alarmed, however, at the increasing power of Rome, the Latins and Hernicans withdrew from the league, and a severe and protracted struggle took place between them and their former ally. Nearly thirty years elapsed before the Romans succeeded in restoring the league of Spurius Cassius. In the course of this war the old Latin confederacy of the "thirty cities" was broken up (B.C. 384), probably as being dangerous to the hegemony of Rome, and their constitutions were more and more assimilated to the Roman. The terms of the treaty made by the Romans (B.C. 348) with the Carthaginians show how very dependent was the position of the Latin cities. Meanwhile, the Romans had pushed their garrisons as far south as the Liris, the northern boundary of Campania. Here they came into contact with the Samnites (q.v.).

The Samnites had long been extending their conquests in the south of Italy. Descending from their native mountains between the plains of Apulia and Campania, they had overrun the lower part of the peninsula. and had firmly established themselves in Lucania, Bruttium, Capua, and elsewhere. The forays of the Samnite highlanders in the rich lowlands of Campania were dreaded above all things by their polished but degenerate kinsmen of Capua, who had acquired the luxurious habits of the Greeks and Etruscans. It was really to save themselves from these destructive forays that the Campanians offered to place themselves under the supremacy of Rome; and thus Romans and Samnites were thrown into a position of direct antagonism. The Samnite wars, of which three are reckoned, extended over 53 years (B.C. 343-290). The second, generally known as the "great Samnite war," lasted 22 years (B.C. 326-304). At first the success was mainly on the side of the Samnites, and after the disaster at the Caudine Forks (q.v.) it seemed as if Samnium was destined to become the ruler of Italy; but the military genius of the Roman consul, Quintus Fabius Rullianus (see Fabius), triumphed over every danger, and rendered all the heroism of Gaius Pontius, the Samnite leader, unavailing. In B.C. 304 Bovianum, the capital of Samnium, was stormed, and the highlanders were compelled to acknowledge the supremacy of the Republic. The third war (B.C. 298-290) was conducted with all the energy of despair; but though the Etruscans and Umbrians now joined the Samnites against the Romans, their help came too late. The victory of Rullianus and of P. Decius Mus, at Sentinum (B.C. 295), virtually ended the struggle, and placed the whole of the Italian peninsula at the mercy of the victor. At the close of the first Samnite war, which was quite indecisive, an insurrection had burst out among the Latins and Volscians, and spread over the whole territory of these two nations; but the defeat inflicted at Trifanum (B.C. 340) by the Roman consul, Titus Manlius Imperiosus Torquatus, almost instantly crushed it, and in two years the last spark of rebellion was extinguished. The Latin league was now dissolved; many of the towns lost their independence and became Roman *municipia;* new colonies were planted both on the coast and in the interior of the Latino-Volscian region; and finally so numerous were the farm allotments to Roman burgesses that two additional tribes had to be constituted.

The war with Pyrrhus (q.v.), King of Epirus, which led to the complete subjugation of peninsular Italy, is a sort of pendant to the great Samnite struggle. The Lucanians and Bruttians, who had aided the Romans in the Samnite wars, considering themselves cheated of their portion of the spoil, entered into negotiations with the enemies of their former associate throughout the peninsula. A coalition was immediately formed against Rome, consisting of Etruscans, Umbrians, and Gauls in the north, and of Lucanians, Bruttians, and Samnites in the south, with a sort of tacit understanding on the part of the Tarentines that they would render assistance by and by. In the course of a single year the whole north was in arms, and once more the power and even the existence of Rome were in deadly peril. An entire Roman army of 13,000 men was annihilated at Arretium (B.C. 284) by the Senonian Gauls, but Publius Cornelius Dolabella marched into the country of the Senones at the head of a large force, and extirpated the whole nation. Shortly afterwards the overthrow of the Etrusco-Boian horde at Lake Vadimo (B.C. 283) shattered the northern confederacy, and left the Romans free to deal with their adversaries in the south. The Lucanians were quickly overpowered (B.C. 282); Samnium could do nothing. A rash and unprovoked attack on a small Roman fleet now brought down on the Tarentines the vengeance of Rome. Awaking to

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a sense of their danger, the Tarentines invited Pyrrhus (q.v.) over from Epirus, and appointed him commander of their mercenaries. He arrived in Italy (B.C. 280) with a small army of his own, and a vague notion of founding an Hellenic empire in the West that should rival that created in the East by his kinsman, Alexander the Great. The varying fortunes of the struggle between Pyrrhus and the Romans, which lasted only five years, ended in his being obliged to return to Epirus without accomplishing anything.

After Pyrrhus, baffled in his attempts to check the progress of Rome, had withdrawn to Greece, the Lucanians and Samnites continued the unequal struggle, but in B.C. 269 the Samnites were utterly and definitely crushed. Tarentum had surrendered three years earlier; and now there was not a nation in Italy that did not acknowledge the supremacy of Rome. Distant kingdoms began to feel that a new power had risen in the world; and Ptolemy Philadelphus, sovereign of Egypt, sent an embassy to Rome (B.C. 273), and concluded a treaty with the Republic. To secure their new acquisitions, the Romans established in the South military colonies at Pæstum and Cosa, in Lucania (B.C. 273), at Beneventum (B.C. 268), and at Æsernia (B.C. 263), to overawe the Samnites; and in the North, as outposts against the Gauls, Ariminum (B.C. 268), Firmum in Picenum (B.C. 264), and the burgess colony of Castrum Novum. Preparations were also made to carry the great Appian highway as far as Brundisium, on the Adriatic, and for the colonization of that city as a rival emporium to Tarentum.

The political changes were almost as important as the military. The whole population of peninsular Italy was divided into three classes—(1) *Cives Romani*, or such as enjoyed the full burgess privileges of Roman citizens; (2) *Nomen Latinum*—that is, such as possessed the same privileges as had been enjoyed by the members of the quondam Latin league—an equality with the Roman burgesses in matters of trade and inheritance, the privilege of self-government, but no participation in the Roman franchise, and consequently no power to modify the foreign policy of the State; (3) *Socii*, or 'allies,' to some of whom were conceded most liberal privileges, while others were governed in an almost despotic fashion. The *Cives Romani* no longer embraced merely the inhabitants of the old Roman community, the well-known 'tribes' (of whom there were now 33), but all the old burgess colonies planted in Etruria and Campania, besides such Sabine, Volscian, and other communities as had been received into the burgess body on account of their proved fidelity in times of trial, together with individual Roman emigrants or their families, scattered among the *municipia*, or living in villages by themselves. The cities possessing the *Nomen Latinum* included most of the 'colonies' sent out by Rome in later times, not only in Italy, but even beyond it; the members of which, if they had previously possessed the Roman franchise, voluntarily surrendered it in lieu of an allotment of land. But any 'Latin' burgess who had held a magistracy in his native town might return to Rome, be enrolled in one of the tribes, and vote like any other citizen. The *Socii* comprised all the rest of Italy, as the Hernicans, the Lucanians, Bruttians, the Greek cities, etc. All national or cantonal confederacies and alliances among the Italians were broken up, and no means were left unemployed by the victors to prevent their restoration.

FROM THE OUTBREAK OF THE PUNIC WARS (B.C. 264) TO THE DESTRUCTION OF CARTHAGE (B.C. 146). At the time when Carthage (q.v.) came into collision with Rome she was indisputably the first maritime empire in the world, ruling as absolutely in the central and western Mediterranean seas as Rome in the Italian peninsula. Between the Carthaginians and the Romans there had long existed a nominal alliance—the oldest treaty dating as far back as the sixth century B.C. But this alliance had never possessed any real significance, and latterly the two nations had come to regard each other with considerable distrust. In B.C. 264 war was formally declared between the two nations on account of a trivial incident.

The wars with Carthage, known as the Punic Wars, were three in number. The first lasted 23 years (B.C. 264-241), and was waged mainly for the possession of Sicily. Its leading feature was the creation of a Roman navy, which finally wrested from Carthage the sovereignty of the seas. Rome, indeed, had never been a merely agricultural State, but events had hindered it from engaging to any large extent in maritime enterprise. The necessity for a navy now began to show itself. Not only was there a difficulty felt in transporting troops to Sicily, but the shores of the mainland were completely exposed to the ravages of Carthaginian squadrons. So energetically did the Senate set to work that (we are told) in 60 days from the time the trees were felled 120 ships were launched, and soon after the consul Gaius Duilius gained a brilliant success (B.C. 260) over the Carthaginians off Mylæ, on the northeast coast of Sicily. Subsequent events, however, were less favorable. An invasion of Africa by Regulus (q.v.) ended in disaster, and the war, which was henceforth confined to Sicily, languished miserably. Thrice the Roman navy was annihilated by storms at sea (B.C. 255, 253, and 249); and in spite of a series of unimportant successes by land, the Romans long found it impossible to make any impression on the Carthaginian strongholds of Lilybæum and Drepanum, mainly on account of the brilliant strategy with which they were held in check by Hamilcar Barca, the father of Hannibal. At last, however, a great sea fight took place off the Ægatian Isles (B.C. 241), in which a Roman fleet commanded by the consul Lutatius Catulus obtained a magnificent victory. The whole of Sicily, except the territory of Hiero of Syracuse, who had been a firm ally of the Romans, passed into the hands of the victors, who constituted it a Roman province and placed it under the government of a prætor. A lapse of 23 years occurred before the Second Punic War began, but during that interval neither Romans nor Carthaginians had been idle. The former had bullied their weak and exhausted rival into surrendering Sardinia and Corsica, which, like Sicily, were transformed into a Roman province. In addition, they had carried on a series of Gallic wars in Cisalpine Gaul (B.C. 231-222), the result of which was the complete humiliation of the barbarian Boii, Insubres, etc., and the extension of Italy to the Alps. On the eastern coast of the Adriatic also the Romans made their power felt by the vigor with which they suppressed Illyrian

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piracy (B.C. 219). Meanwhile the descent of Hamilcar on the Spanish coast was followed, after some ineffectual opposition on the part of the natives, by the establishment of a new Carthaginian empire, or at least a protectorate in the west; and thus, almost before the Romans were aware of it, their rival had made good her losses and was even able to renew the struggle in a more daring fashion than before. How confident the bearing of the Carthaginians had now become may be seen from the fearless spirit in which they accepted the Roman challenge and entered on the Second Punic—or (as the Romans called it) the Hannibalic—war, the grand events of which were the crossing of the Alps by Hannibal, the terrible disasters of the Romans at Lake Trasimenus (B.C. 217) and Cannæ (B.C. 216), and the final overthrow of Hannibal at Zama (B.C. 202) by Scipio, which once more compelled the Carthaginians to sue for peace. In the Second Punic War the Spanish possessions of Carthage, like her Sicilian, passed to the Romans (who formed out of them the Provinces of Hispania Citerior and Hispania Ulterior); so did her protectorate over the Numidian sheiks. She was forced to surrender her whole navy (excepting 10 triremes) and all her elephants and solemnly to swear never to make war either in Africa or abroad, except with the consent of her vanquisher. The Imperial supremacy of Rome was now as unconditional in the western Mediterranean as on the mainland of Italy. Her relations, indeed, to the conquered Italian nationalities became much harsher than they had formerly been, for, after the first victories of Hannibal, these had risen against her. The Picentes, Bruttii, Apulians, and Samnites were deprived either of the whole or the greater part of their lands; some communities were actually turned into serfs; the Greek cities in Lower Italy, most of which had also sided with Hannibal, became the seats of burgess colonies. But the loss of life and of vital prosperity was frightful. Slaves and desperadoes associated themselves in robber bands, but the exultation of victory closed the eyes and the ears of the Romans against every omen, and the perilous work of conquest and subjugation went on. During B.C. 201-196 the Celts in the valley of the Po, who had recommenced hostilities at the very moment Rome was freed from her embarrassments, were thoroughly subjugated; their territory was Latinized, but they themselves were declared incapable of ever acquiring Roman citizenship; and so rapidly did their nationality dissolve that when Polybius, only 30 years later, visited the country, nearly all traces of Celtic characteristics had disappeared. The Boii were finally resubjugated about B.C. 193; the Ligurians were subdued B.C. 180-177, and the interior of Corsica and Sardinia about the same time. The wars in Spain were troublesome and of longer duration, but in the end the superior discipline of the legions always prevailed. So little reliance, however, could be placed on the Spanish submissions that the Romans felt it necessary to hold Spain by military occupation, and hence arose the first Roman standing armies. Forty thousand troops were maintained in the Spanish peninsula year after year. The most distinguished successes were those achieved by Scipio himself, by Quintus Minucius (B.C. 197-196), by Marcus Cato (B.C. 195), by Lucius Æmilius Paullus (B.C. 189), by Gaius Calpurnius (B.C. 185), by Quintus Fulvius Flaccus (B.C. 181), and by Tiberius Gracchus (B.C. 179-178).

Macedonian and Greek Wars. The causes that led to the interference of Rome in the politics of the East are too complicated to be given here, but the Macedonian wars were owing immediately to the alliance formed by Philip V. of Macedon with Hannibal after the battle of Cannæ. The Macedonian wars were three in number. The first (B.C. 214-205) was barren of results, mainly because the whole energies of Rome were directed to Spain and Lower Italy; but the second (B.C 200-197) taught Philip that another and not he must rule in Greece. The battle of Cynoscephalæ was followed by a treaty which compelled him to withdraw his garrisons from the Greek cities, to surrender his fleet, and to pay 1000 talents toward the expenses of the war. Philip was thoroughly quelled, and during the remaining 18 years of his life he adhered to his Roman alliance. But the Ætolians, who had formed an alliance with Rome against Philip, quarreled with their allies, and persuaded Antiochus the Great (q.v.) of Syria to come to Thessaly (B.C. 192). He was overthrown by Scipio (Asiaticus) at Magnesia, in Asia Minor (B.C. 190), and obliged to surrender all his possessions in Europe and Asia Minor, all his elephants and ships, and to pay a heavy war indemnity. Next year the Ætolians were crushed, and a little later the quarrels between the Achæans and Spartans led to a general Roman protectorate over the whole of Greece.

Philip V. of Macedon was succeeded by Perseus (q.v.), who resolved to try the fortune of war with the Romans, and in B.C. 172 the third, and last, Macedonian war began. It ended with the destruction of the Macedonian army at Pydna (B.C. 168) by the consul Lucius Æmilius Paullus (q.v.) and the dismemberment of the Macedonian Empire, which was broken up into four oligarchic republics. The Imperial Republic stopped Antiochus Epiphanes in his career of Egyptian conquest, ordered him instantly to abandon his acquisitions, and accepted the protectorate of Egypt in B.C. 168. Even the allies of Rome—the Pergamenes, the Rhodians, etc.—were treated with harshness and injustice. We may here, for the sake of connection, anticipate the course of history and mention the last Greek and Punic wars. Both of these came to an end in the same year (B.C. 146). The former was caused by an expiring outburst of pseudo-patriotism in the Achaian league and was virtually closed by the destruction of Corinth (q.v.) by the consul Mummius. The latter was not so much a war as a bloody sacrifice to Roman ambition. After Hannibal's death his party in Carthage seems to have recovered the ascendency, and as the commercial prosperity of the city began to revive a bolder front was shown in resisting the encroachments of Masinissa, the Numidian ruler, whom the Roman senate protected and encouraged in his aggressions. In B.C. 146, after a siege of three years, Carthage was stormed by Scipio Africanus Minor and the Carthaginian Empire vanished forever from the earth.

Position of Rome at the Close of the Punic Wars, and Sketch of Its Subsequent Social Condition to the Termination of the Republic (B.C. 146-27). Simultaneously with the

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enormous extension of power and authority in foreign lands, the national character underwent a complete and fatal alteration. The simplicity and stern integrity of life, the religious gravity of deportment, and the fidelity with which common civic and household duties were discharged, which in early times distinguished the Roman burgess, had now all but disappeared. The class of peasant proprietors who had laid the foundations of Roman greatness was either extinct or no longer what it once had been. The long and distant wars made it more and more impossible for the soldier to be a good citizen or a successful farmer. Indolence, inaptitude, and spendthrift habits aided the designs of the capitalists, and in most cases the paternal acres gradually slipped into the possession of the great landlords, who found it more profitable to turn them into pasture or cultivate them by gangs of slaves. The rise of the slave system—though an inevitable result of foreign conquest—was, indeed, the most horrible curse that ever fell on ancient Rome. If the Italian farmer strove to retain his small farm he was exposed to the competition of the capitalists, who shipped immense quantities of corn from Egypt and other granaries, where slave labor rendered its production cheap, and of course he failed in the unequal struggle. Not less pernicious was the change that passed over the character of the rich. As the old Roman patricians lost their exclusive privileges, the plebeians gradually acquired a full equality with them, and the germs of a new social aristocracy originated, based on wealth rather than pedigree, and comprising both plebeians and patricians. During the fourth and third centuries B.C. the political power of this order immensely increased. In fact, the whole government of the State passed into their hands. They became an oligarchy, and while it is not to be denied that they displayed extraordinary ability in the conduct of foreign affairs, selfishness, nepotism, and arrogance gradually became rampant. But far worse than even the selfishness and nepotism of the nobles was their ever-increasing luxury and immorality. When Rome had conquered Greece, and Syria, and Asia Minor, the days of her true greatness were ended. The wealth that poured into the State coffers, the treasures which victorious generals acquired, enabled them to gratify to the full the morbid appetites for pleasure engendered by exposure to the voluptuousness of the East. Such results were, it is true, not brought about in a day, nor without a resolute protest on the part of individual Romans. So long as Rome chose to subdue foreign nations and to hold them by the demoralizing tenure of conquest—i.e., as mere *provinces*, whose inhabitants, held in check by a fierce and unscrupulous soldiery, neither possessed political privileges nor dared cherish the hope of them—it was morally impossible for the citizens, either at home or abroad, to resume the simple and frugal habits of their forefathers. After Cato's time things grew worse instead of better, nor from this period down to the final dissolution of the Empire was a single radical reform ever permanently effected. The momentary success of Tiberius Gracchus and of his far abler brother, Gaius, in their attempts to prevent the social ruin of the State by redistributing the domain lands, breaking down the powers of the senate, reorganizing the administration, and partially restoring the legislative authority of the popular assemblies, hardly survived their death; and the reaction that ensued proved that the senate could learn nothing from adversity, and that the rabble of the city were incapable of elevation or generosity of political sentiment. Henceforth the malversation of the public money by prætors and quæstors became chronic, and the moral debauchery of the mob of the capital by the largesses of ambitious politicians and the vile flattery of demagogues, complete. The old Roman faith, so deep, and strong, and stern, disappeared from the heart. The priests became hypocrites, the nobles 'philosophers' (i.e. unbelievers), their wives practicers of Oriental abominations under the name of 'mysteries;' while the poor looked on with unmeaning yet superstitious wonder at the hollow but pompous ceremonies of religion.

FROM THE DESTRUCTION OF CARTHAGE TO THE TERMINATION OF THE REPUBLIC (B.C. 146-27). We have already alluded to the wars waged in Spain during the first half of the second century B.C. The humane and conciliatory policy pursued toward the natives by Tiberius Sempronius Gracchus, father of the ill-fated tribunes, brought about a peace, B.C. 179, that lasted twenty-five years; but in B.C. 153 a general rising of the Celtiberians took place, followed by another on the part of the Lusitanians. The struggle lasted, with intervals of peace, for the space of twenty years, but ended in the final overthrow of the undisciplined and uncivilized combatant. All the valor of the shepherd warrior Viriathus (q.v.), even if the asssasin's steel had spared his life, would not have prevented the annexation of Lusitania to the Roman Empire, nor did the heroism of the besieged Numantines avail against the skill of the younger Scipio.

Toward the conclusion of the Numantine War occurred the first of those social outbreaks known as 'servile' or 'slave' wars, which marked the later ages of the Republic. The condition of the slaves has been already referred to; but what aggravated the wretchedness of their lot was the fact that most of them had been originally freemen—not inferior in knowledge, skill, or accomplishments to their masters, but only in force of character and military prowess. The first slave insurrection broke out in Sicily, B.C. 134, where the system was seen at its worst. Its leader was one Eunus, a Syrian, who, mimicking his native monarch, took the title of King Antiochus. The suddenness and fury of the revolt for a time rendered all opposition impossible. The slaves overran the island, and routed one Roman army after another. In B.C. 132 the Consul Publius Rupilius restored order in the island. In the East fortune continued to smile upon the Roman arms. Attalus III. Philometer, dying B.C. 133, bequeathed his client-kingdom of Pergamum to its protector, Rome; and after a fierce struggle with a pretender called Aristonicus, the Romans obtained possession of the bequest, and formed it into the Province of Asia, B.C. 129.

We may here enumerate the different provinces into which the Roman Senate divided its foreign conquests in the order of their organization: (1) Sicily, B.C. 241; (2) Sardinia and Corsica, B.C. 238; (3) Hispania Citerior and (4) Hispania Ulterior, B.C. 205; (5) Gallia Cisalpina, B.C. 191; (6) Macedonia, B.C. 146; (7) Illyricum, *circa* B.C. 146; (8) Achaia (or Southern Greece), *circa* B.C. 146; (9) Africa (i.e. the Carthaginian

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territory), B.C. 146; (10) Asia (kingdom of Pergamum), B.C. 129. A few years later, B.C. 118, an eleventh was added by the conquest of the southern part of Transalpine Gaul, and was commonly called, to distinguish it from the rest of the country, 'the Province;' hence the modern *Provence*.

In Africa, the overthrow of Jugurtha (q.v.), B.C. 106, by the Consul Marius, added yet further to the military renown and strength of the Republic. Meanwhile, from a new quarter of the world, a gigantic and unforeseen danger threatened the Roman State. North of the Alps there had long been roaming in the region of the Upper Danube an unsettled people called the Cimbri (q.v.), whose original home was probably the northwest of Germany. They first came into collision with the Romans in Noricum, B.C. 113; after which they turned westward, and poured through the Helvetian valleys into Gaul, where they overwhelmed alike the native tribes and the Roman armies. At Arausio (Orange), on the Rhone, B.C. 105, a Roman army of 80,000 was annihilated; but instead of invading Italy, the barbarians blindly rushed through the passes of the Pyrenees, wasted precious months in contests with native tribes of Spain as valiant and hardy as themselves, and gave the Romans time to recover from the effects of their terrible defeat. Marius, who had just returned from his Numidian victories, was reappointed consul; and at Aquæ Sextiæ (Aix, in Provence) he overwhelmed the Teutones, a northern horde, who had accompanied the Cimbri in their irruption into Spain (B.C. 102). Next year, on the Raudian Fields, in Transpadane Gaul, the same doom befell the Cimbri themselves. In the same year a second insurrection of the slaves in Sicily, which had reached an alarming height, was suppressed by the Consul Marcus Aquillius.

In the succeeding years the internal history of Rome is a scene of wild confusion and discord. Marius, an admirable soldier, but otherwise a man of mediocre talents, and utterly unfit to play the part of a statesman, was the idol of the poor citizens, who urged him to save the State from the misgovernment of the rich. His attempts were failures. Not less fruitless was the wise and patriotic effort of Livius Drusus to effect a compromise between the privileges of the rich and the claims of the poor. The oligarchic party among the former, i.e. the senate, were enraged by his proposition to double their numbers by the introduction of 300 equites; the latter by his offer to the 'Latins' and 'allied Italians' of the Roman franchise. Drusus fell B.C. 91, by the steel of an assassin. Hardly a year elapsed before the whole of the subject 'Italians,' the Marsians, Pelignians, Marrucinians, Vestinians, Picentines, Samnites, Apulians, and Lucanians, were up in wild and furious revolt against Rome (Marsic or Social War); and, though the rebellion was crushed in less than two years by the generalship of Marius, Sulla, and Pompeius Strabo (father of the great Pompey), aided by the shrewd diplomacy of Rome, the insurgents virtually triumphed; for the promise which Drusus had held out to them of the 'Roman franchise,' was made good by the *Lex Plautia Papiria*, B.C. 89. The jealousy that had long existed on the part of Marius toward his younger and more gifted rival, Sulla (q.v.), kindled into a flame of hate when the latter was elected consul B.C. 88, and received the command of the Mithridatic war —an honor which Marius coveted for himself. Then followed the fearful years of civil war (B.C. 88-82), the partisans of Marius continuing to fight fiercely after their leader's death (B.C. 86); proscriptions and massacres were the order of the day. Sulla, the leader of the aristocracy, which was nominally the party of order, triumphed, but the energy displayed by the revolutionists convinced him that the 'Roman franchise' could never again be safely withdrawn from the 'Italians,' and Roman citizens, therefore, they remained till the dissolution of the Empire; but, on the other hand, Sulla's whole legislation was directed toward the destruction of the political party of the burgesses and to the restoration to the senatorial aristocracy and priesthood of the authority and influence they had possessed in the times of the Punic wars. That his design was to build up a strong and vigorous executive cannot admit of doubt, but the rottenness of Roman society was beyond the reach of cure by any human policy. It would be hopeless in our limits to attempt even the most superficial sketch of the complicated history of this period, which will be found given with considerable fullness of detail in the biographies of its leading personages, POMPEY, SERTORIUS, MITHRIDATES, CICERO, CATILINE, CÆSAR, CRASSUS, CATO, CLODIUS PULCHER, BRUTUS, CASSIUS, ANTONIUS, AUGUSTUS. The very utmost we can attempt is to enumerate results.

Abroad the Roman army continued as before to prove irresistible. About thirteen years after the extermination of the northern barbarians, the Cimbri and Teutones, or in B.C. 88, broke out in the Far East the first of the three 'Mithridatic wars.' Begun by Sulla, B.C. 88, they were brought to a successful close by Pompey, B.C. 65, although the general that had really broken the power of Mithridates was Lucullus. The result was the annexation of the Kingdom of Pontus, as a new province of the Roman Republic. In B.C. 64 Pompey marched southward with his army, deposed Antiochus Asiaticus, King of Syria, transforming his kingdom also into a Roman province, and in the following year he made Palestine a dependency of Rome. In B.C. 63 there was hatched at Rome the conspiracy of Catiline (q.v.), which, if it had not been frustrated by the Consul Cicero, would have placed at least the city of Rome at the mercy of a crew of aristocratic desperadoes and cut-throats. One thing now becomes particularly noticeable, the paralysis of the senate. In spite of all that Sulla did to make it once more the governing body in the State, the power passed out of its hands. Torn by jealousies, spites, and piques, it could do nothing but squabble or feebly attempt to frustrate the purpose of men whom it considered formidable. Henceforth the interest as well as the importance of Roman history attaches to individuals, and the senate sinks deeper and deeper into insignificance, until at last it becomes merely the council of the emperors. The famous coalition of Crassus, Pompey, and Cæsar (known as the *first triumvirate*), formed in the year B.C. 60, showed how weak the Government and how powerful individuals had become; and the same fact is even more clearly shown by the lawless and bloody tribunates of Clodius and Milo (B.C. 58-57), when Rome was for a while at the mercy of bravos and gladiators. The campaigns of Cæsar in Gaul (B.C. 58-51), by

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which the whole of that country was reduced to subjection; his rupture with Pompey; his defiance of the senate; the civil wars; his victory, dictatorship, and assassination; the restoration of the senatorial oligarchy; the second triumvirate, composed of Antonius, Lepidus, and Octavianus (Augustus); the overthrow of the oligarchy at Philippi; the struggle between Antonius and Octavianus; the triumph of the latter, through his victory at Actium over the fleets of Antonius and Cleopatra (B.C. 31), and his investment with absolute power for life (B.C. 29), which put an end at least to the civil dissensions that had raged so long (and was therefore so far a blessing to the State), are described in the biographical articles already referred to.

THE ROMAN EMPIRE. When Augustus had gathered up into himself all the civil and military powers of the State, its political life was at an end. Rome had been transformed into an empire, in which some of the forms of the Republic, including the senate and consulship, were preserved. When Augustus died (A.D. 14), the Roman Empire was separated in the north from Germany by the Rhine, but it also included both Holland and Friesland; from the vicinity of the Lake of Constance the boundary followed the Danube to Lower Mœsia, though the Imperial authority was far from being firmly established there. In the extreme east the boundary-line was, in general, the Euphrates; in the south, Egypt (annexed on the death of Cleopatra in B.C. 30), Libya, and, in fact, the whole of Northern Africa, as far inland as Fezzan and the Sahara, acknowledged Roman authority. The Roman franchise was extended to transmarine communities, and in the western provinces especially it became quite common. To keep under subjection this enormous territory—containing so many different races—an army of forty-seven legions and as many cohorts was maintained, levied mainly among the newly admitted burgesses of the western provinces. The reigns of Tiberius (A.D. 14-37), Caligula (A.D. 37-41), Claudius (A.D. 41-54), Nero (A.D. 54-68), Galba (A.D. 68), Otho (A.D. 69), and Vitellius (A.D. 69) present little of any moment in a general survey of the external history of the Empire. The most notable incident of this period is probably the concentration of the prætorian guards in the vicinity of Rome during the reign of Tiberius. Under Claudius, the conquest of Britain, to which Cæsar had made two expeditions, was begun. In Nero's time Armenia was wrested from the Parthians, and only restored to them on condition of their holding it as a fief of the Empire; the Roman authority in Britain was extended as far north as the Trent; and a great rebellion in Gaul (not, however, against Rome, but only against Nero), headed by Julius Vindex, a noble Aquitanian and a Roman senator, was crushed by T. Verginius Rufus, the commander of the Germanic legions. During the profound peace that the Empire had enjoyed everywhere, except on its frontiers, its material prosperity had greatly increased. The population was more than doubled; the towns became filled with inhabitants and embellished with splendid monuments of architecture and sculpture; the wastes were peopled, wherever, at least, the publicani (q.v.) or farmers-general had not got the land into their hands; Roman literature reached its culmination; the refinements of civilization were carried to the Roman frontiers in the far north and to the borders of the African desert in the south; but the immorality of the rich, especially among the women, became yet worse than before, and corruption reigned supreme at the centre of authority.

With the accession of Vespasian (A.D. 69-79) a better era commenced, which, if we except the reign of Domitian, continued uninterrupted for a space of one hundred years, comprising the reigns, besides those mentioned, of Titus (A.D. 79-81), Nerva (A.D. 96-98), Trajan (A.D. 98-117), Hadrian (A.D. 117-138), Antoninus Pius (A.D. 138-161), and Marcus Aurelius Antoninus (A.D. 161-180). These were all men of fine and honorable character. Under all of them the provinces were better governed, the finances better administered, and public morals wonderfully improved. After the time of Vespasian the worst days of Rome (in a moral point of view) were over. Bad emperors she had as well as good, but they did not again succeed in corrupting their age. How far the change was due to the influence of the ever-extending Christian religion it is impossible to tell; but that Christianity did send a reinvigorating breath of new life through the old decaying body of the State is beyond all dispute, and is written on the very face of the history of the first centuries. The chief military events, from the days of Vespasian to those of Marcus Aurelius, are the final conquest of Britain by Agricola (q.v.), the conquest of the Dacian monarchy by Trajan, the victorious invasion of Parthia and of Northern Arabia; the conquest of the valley of the Nile as far south as Upper Nubia, by Trajan; and the chastisement of the Marcomanni, Quadi, Chatti, etc., by Marcus Aurelius. Hadrian's long rule of twenty-one years was peaceful, but is memorable as the most splendid era of Roman architecture. The reigns of Commodus (q.v.), Pertinax (q.v.), and Didius Julianus (q.v.) were insignificant, except in so far as they show the wretched confusion into which the administration of affairs had fallen. Able generals, respectable jurists, honorable senators are not wanting, but their influence is personal and local. The reign of Septimius Severus (A.D. 193-211) is memorable as marking the first real change in the attitude of the emperors toward Christianity. The new religion was beginning to make itself felt in the State; and Severus, who was a Carthaginian, while his wife was a Syrian, may have felt a special interest in a faith that like themselves was of Semitic origin. At all events it was taken under the Imperial protection, and began to make rapid way. Caracalla (q.v.) and Elagabalus (q.v.) are perhaps the worst of all the emperors in point of criminality; but the mad brutality of the one and the monstrous debauchery of the other were purely personal affairs, and were regarded with horror by the citizens of the Empire. The reign of Alexander Severus (A.D. 222-235) was distinguished by wisdom and justice. After the death of Severus followed a period of confusion and bloodshed. The names of Maximinus (q.v.), Maximus (q.v.), Balbinus (q.v.), Gordianus (q.v.), and Philip recall nothing but usurpation, often ending in assassination. Then followed the beginning of the end. The whole of Europe beyond the Roman frontier began to ferment. The Franks showed themselves on the Lower Rhine, the Swabians on the Main; while the Goths burst through Dacia, overthrew the

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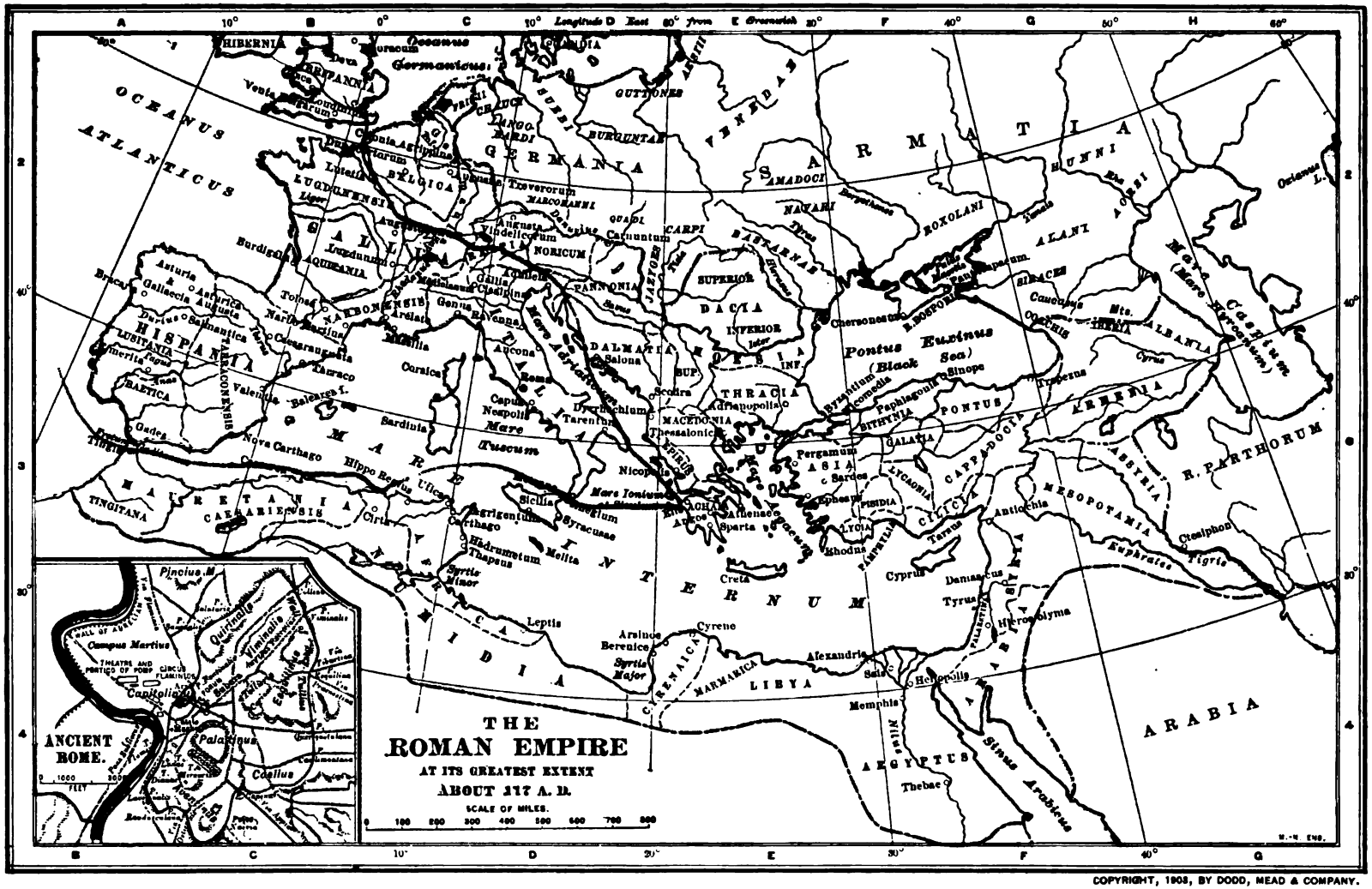

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Emperor Decius (q.v.), and ravaged the whole northern coast of Asia Minor. A little later—during the reigns of Valerianus (q.v.), Gallienus, and the so-called *thirty tyrants*—the Empire is nothing but a wild distracted chaos, Franks, Alemanni, Goths, and Persians rushing in from their respective quarters. The Goths swept over the whole of Achaia, pillaging and burning the most famous cities—Athens, Corinth, Argos, etc.; while the hosts of Sapor committed even greater havoc in Syria and Asia Minor, and but for the courage and skill of Odenathus, husband of Zenobia (q.v.), who had built up a strong independent kingdom in the Syrian desert, with Palmyra for its capital, might have permanently possessed themselves of the regions which they merely devastated. With Claudius Gothicus (A.D. 268-270), the fortunes of the Empire once more begin to brighten. By him, and his successors Aurelian (q.v.), Probus (q.v.), and Carus, the barbarians of the north and northwest, as well as the Persians in the east, were severely chastised. Nay, when Diocletian obtained the purple (A.D. 284), it seemed as if the worst were over, and the Empire might still be rescued from destruction; but his division of the Empire into East and West, with separate *Augusti* and assistant *Cæsars*—though it sprang from a clear perception of the impossibility of one man's administering successfully the affairs of so vast a State—led to those labyrinthine confusions and civil wars, in which figure the names of Maximian (q.v.), Constantius, Galerius (q.v.), Maxentius (q.v.), Maximinus (q.v.), Licinius (q.v.), and Constantine, and which were only brought to a close by the genius of the last-mentioned. Under Constantine (sole Emperor A.D. 323-337) occurred the establishment of Christianity as the religion of the State. Constantine transferred the seat of government from Rome to Byzantium on the Bosporus, where he founded a new city, and named it after himself, Constantinople. But no sooner was the statesman dead than the discords that he had kept under by the vigor of his rule broke loose; the Empire underwent a triple division among his sons; and though Constantius, the youngest, soon became sole ruler, he failed to display the genius of his father, and in his repeated campaigns against the Persians reaped nothing but disaster and disgrace. But the political fortunes of the Empire now possess only a secondary interest; it is the struggle of the Christian sects and the rise of the Church that mainly attract the attention of the historian. There, at least, we behold the signs of new life—a zeal, enthusiasm, and inward strength of soul that no barbarism could destroy. Christianity came too late to save the ancient civilization, but it enabled the Roman world to endure three centuries of utter barbarism, and afterwards to recover a portion of the inheritance of culture that it once seemed to have lost forever. The attempt of the Emperor Julian (A.D. 361-363) to revive paganism was an anachronism. After the death of Julian, who shortly before his accession had beaten back the Franks and Alemanni, the signs of the approaching dissolution of the Empire became more unmistakable. Yet the great State again and again put forth a momentary strength that amazed her foes, and taught them that even the expiring struggles of a giant were to be feared. Valentinian (q.v.), Gratian (q.v.), and Theodosius the Great (q.v.) were rulers worthy of better times. But they fought against destiny, and their labor was in vain. Already swarms of Huns (q.v.) from the east had driven the Goths out of Dacia, where they had long been settled, and forced the Visigoths to cross the Danube into the Roman territory, where the cruelty and oppression of the Imperial officers goaded the refugees into insurrection; and in their fury, they devastated the whole East from the Adriatic to the Euxine. Theodosius, indeed, subdued and even disarmed them; but he could not prevent them from drawing nearer to the heart of the Empire, and already they are found scattered over all Mœsia and Northern Illyricum. For a brief moment (A.D. 394-395) the Roman world was reunited under the rule of Theodosius the Great. On his death occurred the final division into the Western Empire and the Eastern or Byzantine (Greek) Empire. Arcadius and Honorius, the sons of Theodosius, succeeded to the sovereignty of the East and West respectively. Hardly was Theodosius dead when the Visigoths rose again, under their chief, Alaric (q.v.), against Honorius, Emperor of the West. Rome was saved only by the splendid bravery and skill of Stilicho (q.v.), the Imperial general; but after his assassination the barbarians returned, sacked the city (A.D. 410), and ravaged the peninsula. Four years earlier hordes of Suevi, Burgundians, Vandals, and Alani burst into Gaul (where the native Celts had long been largely Romanized in language and habits), overran the whole, and then penetrated into Spain. It is utterly impossible (within our limits) to explain the chaotic imbroglio that followed in the West—the struggles between Visigoths and Vandals in Spain, between Romans and both, between usurpers of the purple and loyal generals in Gaul; the fatal rivalries of Boniface, Governor of Africa, and Aëtius, Governor of Gaul, which led to the invasion of Africa by the Vandals under Genseric (q.v.), and its devastation from the Straits of Gibraltar to Carthage (A.D. 429). Meanwhile in the East the Huns had reduced vast regions to an utter desert. In 451 they swept westward as far as the interior of Gaul. Here they were checked by the forces of Aëtius and the Visigoths on the Catalaunian Plain. In the following year Rome was saved from their assault only through the personal interposition of its Bishop, Leo the Great. Aëtius was assassinated by his sovereign Valentinian III., whose outrages led to his own murder; while his widow, Eudoxia, to be revenged on his murderer and successor, Petronius Maximus, invited Genseric over from Africa, and exposed Rome to the horrors of pillage at the hands of a Vandal horde. Ricimer, of the nation of the Suevi, next figures as a sort of governor of the city, and what relics of empire it still possessed, for Gaul, Britain, Spain, Western Africa, and the islands in the Mediterranean had all been wrested from it. While Majorian—the last able Emperor—lived, Ricimer's position was a subordinate one, but, thenceforth, the Western Emperor was merely an Emperor in name, while the real sovereignty was exercised by this Suevic *maire du palais*, who was succeeded in his functions by the Burgundian King Eunobald, and the latter again by Orestes, in whose time the final catastrophe happened, when Odoacer (q.v.), placing himself at the head of the barbarian mercenaries of the Empire, deposed the last occupant of the throne

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of the Cæsars (A.D. 476), who, by a curious coincidence, bore the same name as the mythical founder of the city—Romulus. The Empire of the East (see BYZANTINE EMPIRE) outlived the Roman Empire by nearly 1000 years. See paragraph *History* under ITALY; PAPAL STATES. Roman archæology has been treated under the head of ARCHÆOLOGY. For the art and religion of ancient Rome, see ROMAN ART and ROMAN RELIGION.

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ROME. A city and the county-seat of Floyd County, Ga., 72 miles northwest of Atlanta; at the junction of the Etowah and the Oostanaula rivers, which here unite to form the Coosa, and on the Southern, the Chattanooga, Rome and Southern, the Nashville, Chattanooga and Saint Louis, and other railroads (Map: Georgia, A 1). It is the seat of Shorter College for Women (Baptist), opened in 1877. Among other features of the city are eight iron bridges, which connect Rome and its suburbs; Mobley Park; the post-office building; and the county court house. Rome is the centre of one of the most productive sections of the State. The river valleys yield large crops of cotton, grain, and hay, and the higher land many varieties of fruit. In addition to its commercial importance, Rome has acquired considerable prominence as an industrial city. It has cotton mills, planing mills, hosiery mills, a tannery, stove works, machine shops, an iron furnace, a large nursery, and manufactories of cottonseed oil, plows, scales, furniture, fertilizers, wrapping twine, brick, lime, crates and boxes, trousers, and mattresses. The government, under the charter of 1883, is vested in a mayor, chosen biennially, and a unicameral council. The waterworks are owned and operated by the municipality. Rome was chartered as a city in 1847. In 1863 the Confederate General Forrest with 600 men here captured a Federal force of 1800 under General Streight, and in 1864 the city was occupied for some time by General Sherman. Population, in 1890, 6957; in 1900, 7291.

ROME. A city in Oneida County, N. Y., 15 miles northwest of Utica; at the junction of the Erie and Black River canals; on the Mohawk River and on the New York Central, the New York, Ontario and Western, and other railroads (Map: New York, E 2). An attractive residential city, Rome is regularly laid out with wide, beautifully shaded streets. The main features of interest are the Jervis and Young Men's Christian Association libraries, State Custodian Asylum, Deaf Mute Institute, and Saint Peter's Academy. The city is the shipping centre of a dairying and farming section, especially noted for its large output of cheese, butter, and hops. The principal manufactures are steel rails, locomotives, brass and copper products, bath-tubs, knit goods, beer, and brick. The government is vested in a mayor, chosen biennially, and a unicameral council. Other administrative officials, with the exception of the school board, which is elected by popular vote, are appointed by the mayor. The water-works are owned and operated by the municipality. On the site of Rome, Fort Stanwix was built in 1758. Near here on August 6, 1777, the battle of Oriskany (q.v.) was fought. Soon after the Revolution Rome was permanently settled, and was organized as a town in 1796. The village was incorporated in 1819, and in 1870 was chartered as a city. Population, in 1890, 14,991; in 1900, 15,343.

ROME. The name of the second novel (1895) of Emile Zola's 'trilogy'—*Lourdes*, *Rome*, and *Paris*. The young priest and hero of *Lourdes*, Pierre Froment, here continues, in the Papal capital, his experiences, which appear to show him how unsatisfactorily, even in Rome, Catholicism enters into the vital progress of modern civilization. He is made to observe, by contrast, the grand working powers of science and of nature.

ROME, UNIVERSITY OF. An institution founded in 1303 by Pope Boniface VIII. It perished during the Great Schism, and was refounded in 1431 by Eugenius IV. It was a Papal institution until 1870, when it came under control of the Italian Government. This university is the old Studium Urbis, now the Royal University, and is not to be confounded with the University of the Curia or the Papal Court, which was founded by Innocent IV. in 1244-45. The Royal University had in 1901 a budget of about 975,000 lire, and between 2300 and 2400 students, and included an engineering school and a school of pharmacy besides the faculties of philosophy, science, and law. Its library, the Biblioteca Alessandrina, contains about 95,000 volumes, besides 60,000

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pamphlets and several hundred manuscripts. The university comprises one college, the Collegio Capranica, founded by Cardinal Capranica in 1458.

RO'MEO AND JU'LIET. A tragedy by Shakespeare, first printed surreptitiously by Danter in 1597, probably from an old stage copy. A corrected edition appeared in 1599. The earliest form of the play was written possibly in 1591, while the development into the present setting can be detected by comparing the two editions. The source of the story of the lovers is a tale in the collection of Massuccio di Salerno, printed in 1476, though similar incidents are found in a romance by Xenophon Eplusius, a mediæval Greek writer. It was told again by Luigi da Porto in his *Historia di due nobili amanti* in 1530, derived from oral sources and the first to give the names of the lovers. The story was told in verse by Gherardo Boldiero in 1553, and again by Bandello as *La sfortunata morte di due infelicissimi amanti*, in his *Novelle* in 1554. This was translated into French by Pierre Boisteau in his *Histoires tragiques*, 1559, and thence into English by Paynter in the *Palace of Pleasure*, 1567, as *Rhomeo and Julietta*. The direct source of the tragedy, an English poem, "The Tragicall Historye of Romeus and Juliet," was written by Arthur Brooke in 1562, who mentioned an old play on the subject, now lost. The tale has no historical foundation, though told in Girolano della Corte's *Storia di Verona* in 1594, as an event of 1303. It has been a favorite subject for musical composers. Zingarelli produced the opera *Giulietta e Romeo* in 1796; Bellini, *I Capuletti ed i Montecchi* in 1830; and Gounod, *Roméo et Juliette* in 1867; while Berlioz wrote the dramatic symphony *Roméo et Juliette* in 1839.

ROMERO, rō-mā'rō, MATIAS (1837-98). A Mexican diplomat, born and educated in Oaxaca. He studied law in the City of Mexico and was admitted to the bar in 1857. From 1859 to 1863 he was connected with the Mexican legation at Washington, most of the time as chargé d'affaires; and, after serving under Diaz against the French, returned to Washington as plenipotentiary. Returning to Mexico in 1868, he was for six years Secretary of Treasury (1868-72, and 1877-78), and for two years Postmaster-General. From 1882 until his death, except for an interval in 1892, he was again Minister to the United States. He published many official reports, *Correspondence of the Mexican Legation at Washington During the French Intervention* (1870-85), *Geographical and Statistical Notes on Mexico* (1898), and *Mexico and the United States* (1898).

ROMEYN, rō'mīn, JOHN BRODHEAD (1777-1825). An American clergyman. He was born at Marbletown, Ulster County, New York, received his early education at an academy, since developed into Union College, and graduated at Columbia in 1795. In 1798 he was licensed to preach by the Classis of Albany, and the following year was ordained pastor of the Reformed Dutch Church of Rhinebeck, New York. In 1803 he became pastor of the Presbyterian Church in Schenectady and the following year accepted a call from the First Presbyterian Church in Albany. In 1808 he removed to the Cedar Street Church, New York, with which he remained until his death. He was one of the movers in the establishment of the Princeton Theological Seminary and served as director until his death. In 1810, then only thirty-three, he was appointed Moderator of the Presbyterian General Assembly.

ROMFORD, rūm'fērd. A market town in Essex, England, on the Bourne, 12 miles east-northeast of London (Map: England, G 5). It is noted for its ale breweries and market gardens, which are extensively cultivated; it has also iron works and pyrotechnic factories, and grain and cattle markets are periodically held. Romford dates from the Saxon period. Population, in 1901, 13,650.

ROMILLY, Sir SAMUEL (1757-1818). An English jurist, born at Westminster. He was called to the bar in 1783, and in 1805 was made Chancellor of the County Palatine of Durham, which position he held until 1815. He was returned to Parliament several times and was active in securing various reforms, especially in the mitigation of the harsh criminal laws. He was opposed by the conservative faction in the House of Commons. His mind was deranged by the death of his wife and he committed suicide in 1818. Besides numerous pamphlets, he published: *Observations on the Criminal Law of England* (London, 1813); *Thoughts on Executive Justice* (ib., 1786); *Objections to the Project of Creating a Vice-Chancellor of England* (ib., 1813).

BARON ROMILLY, son of Sir Samuel, was successively Solicitor-General, Attorney-General, and Master of the Rolls. He performed a great public service in the supervision of a compilation and collection of the Public Records of England.

ROM'NEY, GEORGE (1734-1802). An English portrait painter, born at Dalton, in Lancashire. In 1753 he was apprenticed for a short time to Steele, a portrait painter, at Kendal, after which he settled at Westmoreland, where he practiced portrait painting for several years. In 1762 he went to London, where his "Death of Wolfe" won him a prize of the Society of British Artists. He also studied in Italy and France, being much influenced by Titian in color, and by Greuze, whose sentimental manner he adopted. Upon his return to London, in 1775, he became very popular and divided patronage with Reynolds and Gainsborough. He continued to reside there until 1799, when he returned to his wife, whom he had deserted when he first went to London, and who now nursed him until his death. He had bestowed his affections upon his favorite model, the beautiful Emma Hart, afterwards Lady Hamilton, whom he painted as Bacchante, Circe, Joan of Arc, Magdalen, and Sibyl. Among his other works are portraits of Mrs. Cawardine and child, Lady Cavendish-Bentinck, Miss Sneyd as Serena, Lady Warwick and her children, Mrs. Davenport, the actress, and Lady Russell and child (1784). In the National Gallery are the "Parson's Daughter" and "Bacchante;" in the National Portrait Gallery, a portrait of Richard Cumberland and Lady Hamilton. The art of Romney has been described by Muther as "holding the mean course between the refined classic art of Reynolds and the imaginative poetic art of Gainsborough." He was a very dexterous painter and possessed the art of beautifying his model without making the picture unlike the original. His treatment was broad and the number of colors was limited, but he used them at times with depth and harmony. Consult: Hagley, *The*

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Life of George Romney (London, 1809); John Romney (son of the painter), *Memoirs of the Life and Writings of George Romney* (London, 1830).

ROMNY, rôm'nê. A town in the Government of Poltava, Russia, 110 miles northwest of Poltava (Map: Russia, D 4). It has extensive manufactures of tobacco and flour. Its fairs are also important. Population, in 1879, 22,539.

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ROMORANTIN, rô'mô'rän'tăn'. The capital of an arrondissement in the Department of Loir-et-Cher, France, 39 miles southwest of Orleans (Map: France, H 4). It has important manufactures of cloth. The edict issued from here in 1560 prevented the establishment of the Inquisition in France. Population, in 1901, 8130.

ROM'ULUS. The mythical founder of the city of Rome. His name indicates that he is to be regarded rather as a symbolical representation of the Roman people than as an actual individual. According to the legend there had ruled at Alba Longa, in Latium, a line of kings descended from the Trojan prince Æneas. One of the latest of these at his death left the kingdom to his eldest son, Numitor. Amulius, a younger brother of Numitor, deprived the latter of the sovereignty, murdered his only son, and compelled his only daughter, Silvia (generally called Rhea Silvia), to become a vestal virgin. Silvia having become the mother of twins by the god Mars, the fears of Amulius were aroused, and he caused the cradle containing the babes to be thrown into the Anio, whence it was carried into the Tiber. The cradle was stranded at the foot of the Palatine, and the infants were saved from death by a she-wolf which carried them into her den, near at hand, and suckled them, while a woodpecker brought them whatever food they wanted. Faustulus, the King's shepherd, who bore the infants home to his wife, Acca Larentia, had them brought up with his own children. In a quarrel between them and the herdsmen of Numitor, Remus, one of the twins, was taken prisoner, and carried off to Numitor.

Romulus soon made his appearance, accompanied by his foster-father; their story was related, and Numitor recognized the boys as the sons of his daughter Silvia. They immediately proceeded to avenge the family wrongs by slaying Amulius and placing their grandfather on the throne. But Romulus loved their old abode on the banks of the Tiber, and resolved to build a city there. The Palatine was chosen (by augury) for the site, and Romulus, yoking a bullock and a heifer to a plowshare, marked out the *pomœrium*, or boundary, on which he proceeded to build a wall. Remus, to show its inefficiency, scornfully leaped over it, whereupon Romulus slew him, but was immediately struck with remorse, and could obtain no rest till he had appeased the shade of his brother by instituting the *lemuria*, or festival for the souls of the departed. Romulus next erected a sanctuary on the Capitoline for runaway slaves and homicides. But wives were much wanted; and this led to the "Rape of the Sabine Women"—a wholesale abduction of virgins, the consequence of which was a series of wars, in which, however, Romulus was invariably victorious, until Titus Tatius, at the head of a large army of Sabines, forced him to take refuge in his city on the Palatine. The treachery of Tarpeia, a daughter of a lieutenant of the fort, placed the Capitolium in the hands of his adversaries. In the battle the next day between the two hills, Sabines and Romans fought till they were exhausted, when the Sabine women rushed in between their husbands and fathers and implored them to be reconciled. This was agreed to, and henceforth they resolved to unite and to form one people—the followers of Romulus dwelling on the Palatine, those of Titus Tatius on the Capitoline and Quirinal. On the death of Titus Tatius Romulus became sole sovereign, and subsequently made successful war against the Etruscan cities of Fidenæ and Veii. After a reign of thirty-seven years Romulus was miraculously removed from earth. While he was standing near the "Goat's Pool," in the Campus Martius, reviewing his militia, the sun was eclipsed, and he was carried up to heaven in a chariot of fire by Mars. Some time after he reappeared, announced the future glory of the Roman people, and told them that henceforth he would watch over them as their guardian god, under the name of Quirinus. The festival of the Quirinalia, February 17th, was instituted in his honor; but the nones of Quintilis (July 7th) was the day on which he was believed to have departed from earth. As early as the end of the Republic a sacred spot, marked by a 'black stone,' by or upon the Comitium, near the Rostra, was pointed out as the grave of Faustulus, or, as some said, of Romulus. Excavations in the Forum in the year 1898-99 brought to light in this place a rectangular pavement of black marble, about ten by thirteen feet in dimensions, which for various reasons it seems safe to identify with this monument. See FORUM.

RON'ALDSHAY, NORTH AND SOUTH. Two of the Orkney Islands (q.v.).

RONCADOR (Sp., snorer, grunter), or RONCO. A name in California for several fishes of the family Sciænidæ (see DRUM), which furnish both food and sport. The principal one is *Roncador Stearnsii*, from two to three feet long when full-sized, and highly esteemed. Another species is the 'red' roncador (*Corvina Saturna*).

RONCADOR (*Roncador Stearnsii*).

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RONCAGLIA, rôn-kä'lyȧ. A village in the Province of Piacenza, Italy, noted for the diets and reviews which the Holy Roman emperors frequently held here, on the Roncaglian Fields, when they descended from Germany into Italy. In 1158 Frederick Barbarossa held a diet here which determined that the cities did not possess the right to elect their own officers, and in other respects were subject to the Emperor. The result was a rebellion of the Lombard towns. See LOMBARD LEAGUE.

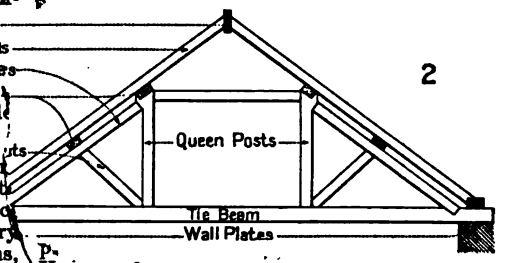
RONCESVALLES, *Sp. pron.* rôn'thĕs-vȧl'yes (Fr. *Roncevaux*), a pass in the Pyrenees between Pamplona and Saint-Jean-Pied-de-Port. Here the rear guard of Charlemagne's army was defeated in 778. See ROLAND, THE SONG OF.

RONDA, rōn'dȧ. A town of Southern Spain in the Province of Malaga, situated 42 miles north of Gibraltar, on the railroad between that place and Granada (Map: Spain, C 4). It is very picturesquely located among lofty mountains, and the town is divided by a gorge 300 feet wide and nearly 600 feet deep, with precipitous rocky sides, at the bottom of which rushes the Guadalevin River. The gorge is crossed by three bridges, one said to date from Roman times, one built by the Moors, and the third built in the eighteenth century. The town itself is surrounded by olive groves and vineyards, and has a delightful climate. It is a very old town, with well-preserved remains of Moorish walls and towers, and many Moorish buildings. It has a *Plaza de Toros.* The chief industries are flour-milling and wine production. Population, in 1887, 18,350; in 1900, 20.822.

RONDEAU, rôn'dô' (Fr. *rondeau,* from OF. *rondel,* round plate, cake, scroll, diminutive of *rond,* round, from Lat. *rotundus,* round, wheel-shaped, from *rota,* wheel). A French form of versification often imitated in other countries. The rondeau consists of thirteen verses, eight on one rhyme, five on another, separated by a pause at the fifth verse and by another at the eighth. The first word or words are repeated after the eighth and the thirteenth verses. The *rondeau redoublé* or doubled rondeau is a poem of twenty verses in five quatrains. The four verses of the first quatrain made successively the last verse of the other four quatrains. Sometimes a sixth quatrain, called the *envoi,* is added, after which the first word on the first half-verse of the poem is repeated. The rondeau was a favorite form of Adam de la Halle (q.v.) and of Guillaume de Machault (q.v.) and was cultivated by many other poets. Nowadays it is seldom employed in France or elsewhere. In England the rondeau was skillfully revived by poets like Rossetti and Swinburne, Austin Dobson, and Andrew Lang. It had been used as early as Chaucer (c.1340-1400), and later by Hoccleve (c.1370-c.1450), by Lydgate (c.1370-c.1451), by Charles of Orleans both in his French and English poems (but with fourteen lines), and by others. What is known as the rondeau of Villon has only ten lines. Consult Gleeson White, *Ballades and Rondeaus* (London, 1887). For the musical form of similar name, see RONDO.

RONDO (It., from Fr. *rondeau,* roundel). One of the oldest and most generally used of the musical forms, characterized by the constant recurrence of one principal theme. The oldest ron-

ROOK (AS. *hrōc,* OHG. *hruoh,* rook; connected with Goth. *hrōkjan,* to crow, Skt. *kruc,* to cry out). A species of crow (*Corvus frugilegus*), very common in the southern parts of Britain and found in many parts of Europe and Asia, even to Japan; about the same size as the common crow, but easily distinguished from it, even at a distance, by its color, which is a glossy, deep-blue black, in certain aspects grayish. On



He was [illegible] POST ROOF.

cated at Breslau, e[illegible] distinction is found priesthood, and was settled [illegible]se of the bill, he published criticisms of the re[illegible]nd quite Rome and the Breslau Cathedral cha[illegible]rious; was suspended in consequence (1843). He went to Laurahütte in Upper Silesia as a teacher, and while there the exhibition of the Holy Coat (q.v.) at Treves so stirred his ire that he denounced it in print (1844), and was excommunicated. The agitation occasioned by his action led to the founding of the German Catholic Church, and he became pastor of the German Catholic Church at Breslau in 1845. Ronge took part in the political struggles of 1848 and was prominent as a democratic leader. From 1849 to 1861 he was a fugitive in consequence of his political activities. When permitted to return he went to Breslau, and in 1863 to Frankfort, and endeavored to revive the waning German Catholicism. In 1873 he removed to Darmstadt, and there edited a paper in promotion of his plans. He died in Vienna, October 26, 1887. Consult *The Autobiography and Justification of J. Ronge, Translated from the Fifth German Edition* (London, 1846).

RONGER, rôn'zhȧ', FLORIMOND. The real name of the French musical composer commonly known as Hervé (q.v.).

RONGS. A Tibetan people. See LEPCHAS.

RONSARD, rôn'sär', PIERRE DE (1524-85). A French poet and literary reformer. Ronsard was born at the Château de la Poissonnière (Vendômois), of a noble family, which may have come from Hungary in the reign of Philip VI., though recently discovered documents suggest rather a Flemish origin and a less ancient nobility. At the age of nine he was sent to the College of Navarre, but he left it after six months, "without profit," he said. Then his father took him to Avignon, where he remained a little while as a page in princely service. In 1540 he accompanied Lazare de Baïf on his embassy to Speyer and Guillaume de Langey (du Bellay), the Viceroy of Piedmont, to Turin. In 1542 he returned to France, apparently destined to a brilliant diplomatic or military career; but growing deafness checked his ambition in that direction, and he turned to study and to literature. His first studies were shared with

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Life of George Romney (London, 1809); John Romney (son of the painter), *Memoirs of the Life and Writings of George Romney* (London, 1830).

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ROMORANTIN. [illegible] Scotland; here he [illegible] of his works (1584).

of an arrondis[illegible] master in poetic imagination, et-Cher, [illegible] technique of language and metre. His (Man[illegible]d brilliancy, whether in verse or prose, [illegible] not been equaled in France. He was first to popularize the sonnet. He restored the Alexandrine line to due honor, and introduced many original lyric stanzas with which anthologies and imitation have made all familiar. His lyrics have the naïveté of the Renaissance, a free healthy naturalism, in which there is hardly ever a morbid strain.

Ronsard's *Works* were printed seventeen times before 1630, and were well edited by Blanchemain (8 vols., Paris, 1857-67), and by Marty-Laveaux (6 vols., ib., 1887-93). There is a selection, *Œuvres choisies*, in one volume by Sainte-Beuve (Paris, 1828, and since often reprinted, with additions by Louis Moland); other selections are by Voizard, Noël, and Becq de Fouquières. For criticism and biography, consult: Pellissier's essay in Petit de Julleville's *Histoire de la langue et de la littérature française* (vol. iii., Paris, 1898, with a good bibliography); Gandar, *Ronsard imitateur d'Homère et de Pindare* (Metz, 1854); Rochambeau, *La famille de Ronsard* (Paris, 1869); Chalandon, *Essai sur Ronsard* (ib., 1875); Mellerio, *Lexique de la langue de Ronsard* (ib., 1895); Pieri, *Pétrarque et Ronsard* (ib., 1895); Faguet, *XVI. siècle* (ib., 1894); and Sainte-Beuve, *Causeries du lundi*, vol. xii. (which is used also by way of introduction to later editions of the *Selections* by Sainte-Beuve, mentioned above). Among those who have translated poems by Ronsard are Henry Francis Cary, Longfellow, Lord Lytton (in *Orval*), and Andrew Lang. In his *Songs and Sonnets of Pierre de Ronsard* (Boston, 1903), C. H. Page has put into English verse seventy-six poems, most of which had not previously been translated.

RONSDORF, rôns'dôrf. A town and railway station in the Rhine Province of Prussia, 3 miles southeast of Elberfeld. It is largely engaged in manufacturing, having iron works, foundries, machine shops, copper works, ribbon mills, dyeing establishments, etc. Population, in 1900, 13,297.

RÖNTGEN, rênt'gen, WILHELM KONRAD. See ROENTGEN, WILHELM KONRAD.

RÖNTGEN RAYS. See X-RAYS.

ROOD. The cross on which Christ suffered; in modern usage, the name is most commonly applied to the large and striking crucifix, generally with standing figures of Mary and John on either side of it, which was placed at the entrance of the choir or chancel in most mediæval churches. Often it stood on a gallery or screen, known as the rood-loft or rood-screen.

ROOD (AS. *rōd*, pole, crucifix, OHG. *ruota*, Ger. *Rute*, rod; possibly connected with Lat. [illegible]*ius*, staff, Skt. *rudh*, to grow). A measure [illegible] surface. It is the fourth part of an acre and [illegible]tains 40 square poles or perches.

ROOD, OGDEN NICHOLAS (1831-1902). An American physicist, born at Danbury, Conn. After graduating at Princeton in 1852 he studied at the universities of Munich and Berlin, and was made professor of physics and chemistry at the University of Troy (1858), and professor of physics in Columbia College (1863). He was elected a member of the National Academy of Sciences in 1864, and served as vice-president of the American Association for the Advancement of Science (1868). His investigations have embraced problems in mechanics, electricity, optics, and acoustics. He was the first to construct fluid prisms of great dispersive power for use in spectroscopic studies, and was also one of the first to apply photography to the miscroscope. His investigations on the nature of the electric spark and duration of lightning flashes are valuable, as they determined most accurately minute intervals of time. He constructed an air-pump (q.v.) which for many years held a record for high vacua, and devised a method of photometry which was independent of color. Professor Rood was able to demonstrate the regular or specular reflection of X-rays and also investigated materials of high electrical resistance. He wrote *Modern Chromatics* (New York, 1874), a standard work on color, and many scientific papers published for the most part in the *American Journal of Science*.

ROOF (AS., Icel. *hrōf;* probably connected with Gk. κρύπτειν, *kryptein*, to hide). The topmost covering of a building, including its supporting framework. The commoner forms of roof are the *gambrel*, having two slopes meeting in a horizontal ridge and terminated at the end walls by triangular *gables* or pediments; the *hipped* roof, which has four sloped surfaces rising from the four walls to the short central ridge; the *gabled*, with a double slope on either side, the lower part steep, the upper part flatter; the *mansard*, which is a hipped gambrel roof with a nearly flat upper slope. Other roofs form pyramids or cones, which are called *spires* when very lofty and relatively slender. A roof of convex form on a round or polygonal plan is called a *dome* or cupola; if formed with a double curve it is sometimes called a *bell-roof*. A roof of a single slope from a higher to a lower side wall is called a *lean-to*, *pent*, or *shed roof;* such are the roofs of most side-aisles of churches.

The construction of roofs varies with material and span. The simplest are the primitive flat roofs of the Orient, made with cross-beams, thatch, and a heavy layer of stamped clay. In Central Syria and in Egypt important buildings were roofed with enormous beams and slabs of stone. The Greeks employed a low-pitched gable roof, carried by simple trusses of wood and cov-

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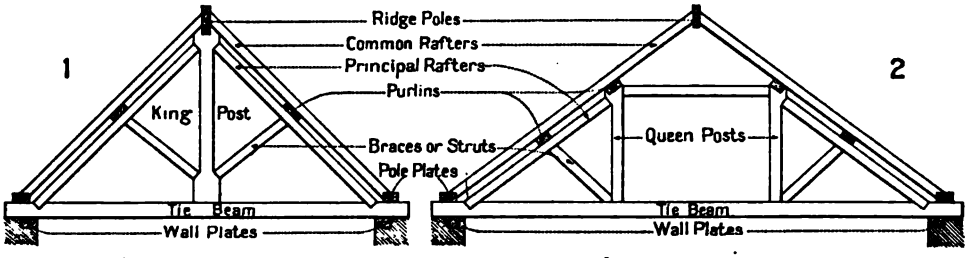
ered with tiles of marble or terra-cotta. The Romans were the first to span broad halls with vaults and domes of brick or concrete, covered probably with lead for protection from the rain; they also used roofs carried by elaborate timber trusses and covered with tiles or with bronze plates. It was in the mediæval cathedrals that the system was developed of an inner covering or *ceiling* of stone vaulting, with an outer protective roof of timber trusses sheathed with boards and covered with copper, lead, slate, or tiles; these roofs were of a very steep pitch. At the same time there were built many roofs without the stone vaultings, the timber supporting trusses being exposed to new and decoratively treated ('open-timber roofs') and the spaces between them richly paneled. Since the Renaissance it has been customary to hide the roof behind a decorative ceiling of plaster or of paneled woodwork; on the other hand, the external roof has received much attention, and its form and decorative treatment are important elements in the design of many modern edifices. In those, however, of Italian classic type, the roof is kept nearly flat and masked by balustrades and parapets.



1. KING-POST ROOF. 2. QUEEN-POST ROOF.

The structural design of the trusses or other framework which supports the roof has in all ages been one of the determining factors in architectural development. In modern practice, although wood is by far the commonest material used, steel takes its place for structures of great span, and by its use spaces 376 feet wide have been roofed without intermediate supports (Liberal Arts Building, Chicago Columbian Exhibition, 1893). For such roofs arched trusses are used. Iron and steel roofs of 250 feet span are not uncommon in railway stations. The largest vaulted roof is that of the Pantheon at Rome, a dome 142 feet in diameter. See DOME.

In ordinary roof construction the truss is of the *king-post* type (Fig. 1), for spans up to 35 feet; or the *queen-post* type (Fig. 2) for spans up to 60 feet; though there are more complex types. The horizontal beams resting on these are called *purlins;* these carry the *jack-rafters*, and to these last is nailed the *sheathing*, which is covered by the *roofing*. The roofing may be of tar and gravel, of tin or of copper (for nearly flat roofs), of shingles, slates, metal tiles, or terra-cotta tiles for steep roofs. The part of the roof which projects over the wall is called the *eaves*, and the trough for carrying off the rainwater, the *gutter*. Consult: Denfer, *Couverture des édifices* (Paris, 1893); Merriman and Jacoby, *Roofs and Bridges* (New York, 1896); and the authorities referred to under BUILDING.

ROOFING FELT. See FELT.

ROOK (AS. *hrōc*, OHG. *hruoh*, rook; connected with Goth. *hrōkjan*, to crow, Skt. *kruc*, to cry out). A species of crow (*Corvus frugilegus*), very common in the southern parts of Britain and found in many parts of Europe and Asia, even to Japan; about the same size as the common crow, but easily distinguished from it, even at a distance, by its color, which is a glossy, deep-blue black, in certain aspects grayish. On a nearer view a more notable distinction is found in the naked warty skin at the base of the bill, extending back rather beyond the eyes, and quite far down on the throat. The rook is gregarious; and very large companies often assemble in rookeries, making their nests in close proximity, generally in tall trees, the same tree often sustaining many nests. Most cities or large towns in Great Britain have rookeries, sometimes of considerable magnitude. In all of their habits rooks are much like the American crows. Consult writings of European naturalists, especially as to the flocking, Selous, *Bird Watching* (London, 1901).

ROOKE, Sir GEORGE (1650-1709). An English admiral. He was born near Canterbury, at the country-seat of his father, Sir William Rooke. He entered the navy, saw active service against the Dutch, and in 1689 was promoted to the rank of rear-admiral. He was engaged in the action off Beachy Head in 1690 between the Earl of Torrington and the French admiral Tourville, and in 1692, in the battle of La Hogue, fought between the French fleet and the combined English and Dutch force under Admiral Russell, led the night attack on the enemy's fleet which resulted in the burning of 13 French ships with the loss on the allied side of only 10 men. For his brilliant services on this occasion he received the rank of vice-admiral of the red, the honor of knighthood, and a pension of £1000 a year. His next important service was the destruction of a Franco-Spanish plate-fleet in the port of Vigo; and in July, 1704, in conjunction with Sir Cloudesley Shovel, he accomplished the capture and annexation to the British Crown of Gibraltar (q.v.). A few days later off Malaga, he fought an indecisive battle with a French fleet of superior force, under the Comte de Toulouse; the French loss was upwards of 3000, the English upwards of 2000 men. Consult *The Life and Glorious Actions of Admiral Sir George Rooke, M.P.* (London, 1707; new ed., 1713).

ROON, rōn, ALBRECHT THEODOR EMIL, Count von (1803-79). A Prussian field-marshal and war minister, born at Pleushagen near Kolberg. He was trained at the military school in Berlin, and in 1836 was appointed to the general staff with the rank of captain. In 1858 he was

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commander of the Fourteenth Division, and six months later became lieutenant-general. In 1859 he was made Minister of War, and in 1861 became also Minister of Marine, holding that office for 10 years. The splendid effectiveness of the German army in 1866 and 1870-71 was due in very great measure to Von Roon's talents as an organizer and administrator. On January 1, 1873, he was made President of the Cabinet, and Field-Marshal. He resigned November 9, 1873, the ministry of war and the presidency of the Cabinet, as Bismarck found it necessary to combine his position as Imperial Chancellor with that of President of the Cabinet. Von Roon, who was a pupil of Karl Ritter, wrote a number of authoritative geographical works, the best known of which is the *Anfangsgründe der Erd-, Völker- und Staatenkunde* (1834). Consult: Waldemar Count Roon, *Denkwürdigkeiten aus dem Leben des General-Feldmarschalls Grafen von Roon* (2 vols., Breslau, 1892); id., *Kriegsminister von Roon als Redner* (ib., 1895-96).

ROOS, rōs, JOHANN HEINRICH (1631-85). A German animal painter and etcher, born at Otterberg in the Palatinate. Early in life he went to Amsterdam, where he studied under Juliaen du Jardin, Barend Graat, and Adriaen de Brie. In 1650-54 he visited Italy, France, and England, in 1657 settled at Frankfort, and in 1673 was appointed court painter to the Elector-Palatine. At first Roos painted portraits and genre scenes, but soon turned to those animal pieces with landscape surroundings, for which he is famous, excelling particularly in the representation of sheep. His works, notwithstanding their great finish and his comparatively short life, are very numerous and are to be found in the Pinakothek in Munich, in Berlin, Dresden, Vienna, and Frankfort, while two may be seen in the collection of the Historical Society, New York. His forty-four etchings are also held in great esteem. His son and pupil, PHILIPP PETER (surnamed Rosa di Tivoli) (1655-1705), born at Frankfort, painted landscapes and animals, in his earlier period in the style of his father; but in 1677 he went to Rome, studied under Brandi, whose daughter he married, and after settling at Tivoli, whence his surname, he adopted a peculiar style of his own, painting life-size figures and animals in a broad manner and a heavy brown tone and producing a rather unpleasant effect. Another son and pupil, JOHANN MELCHIOR (1659-1731), born at Frankfort, was an animal and portrait painter. The Darmstadt and Stuttgart museums contain each a "Stag Hunt" and a "Boar Hunt," the Dresden Gallery, "Stags Under an Oak" (1714), and the Städel Gallery, Frankfort, a "Lion Family in a Landscape" (1716).

ROOSA, rōō'sȧ, DANIEL BENNETT ST. JOHN (1838—). An American physician, born at Bethel, Sullivan County, N. Y. He graduated in 1860 at the medical school of the University of New York, was assistant-surgeon in the Fifth New York Volunteers' three-months' troops, became resident surgeon at the New York Hospital in 1862, and in 1864, after study in Europe, began practice in New York City. From 1863 to 1882 he was professor of diseases of the eye and ear in the medical school of the University of the City of New York (now New York University), and from 1875 to 1880 held a similar chair in the University of Vermont (Burlington). In 1888 he was appointed professor of diseases of the eye in the New York Post-Graduate Medical School, of whose faculty he also became president. He was one of the founders of the Manhattan Eye and Ear Hospital. Among his original works are: *A Treatise on the Ear* (1866) and *On the Necessity of Wearing Glasses* (1877).

ROOSEVELT, rō'z'-vĕlt, NICHOLAS J. (1767-1854). An American inventor. He was born in New York City. His claim to distinction is based upon his invention of the vertical paddle-wheel for use in steamboats. As early as the Revolution he used the idea in a small boat in which there were two side-wheels that were turned by springs. In 1797, together with R. R. Livingston and John Stevens, he built a steamboat; but, as contrary to his advice, chains and floats were used instead of paddle-wheels, the boat proved a failure. Financial difficulties prevented him from following out his idea, and ultimately Fulton adopted it with success. In 1809 Roosevelt, after considerable controversy with Fulton, entered into a partnership with him for the introduction of steamboats on western waters. Two years later Roosevelt built at Pittsburg the boat *New Orleans*, and successfully navigated her down the Ohio and the Mississippi to New Orleans. Consult Latrobe, "A Lost Chapter in the History of the Steamboat," in vol. v. of the *Maryland Historical Society Fund Publication* (Baltimore, 1871).

ROOSEVELT, ROBERT BARNWELL (1829—). An American author and reformer. He was born in New York City, and was the son of Nicholas van Schaick Roosevelt and an uncle of Theodore Roosevelt. He was admitted to the bar in 1850, and practiced with success for many years. In 1867 he brought about the formation of the New York State Fishery Commission, and until 1888, when he became United States Minister to Holland, was one of its commissioners. He first entered active politics as an opponent of the Tweed 'Ring,' and as an organizer of the 'Committee of Seventy,' as vice-president of the Reform Club, and as an editor of the *Citizen*, he did much to break up that organization. In 1870 he was elected to the lower House of Congress, and served there with credit. He published: *The Game Birds of North America* (1860); *The Game Birds of the North* (1866); *Superior Fishing* (1866); *Florida and the Game Water Birds* (1868); and *Progressive Petticoats* (1871).

ROOSEVELT, THEODORE (1858—). The twenty-sixth President of the United States, born in New York City, October 27, 1858. He was educated at Harvard University, where he graduated in 1880, and afterwards attended the law school of Columbia University. He turned early to politics and was elected to the New York Assembly in 1881 as an opponent of the Tammany Hall machine. There, for more effective service, he allied himself with the Republican minority, although not a member of that party, and for three terms, 1882,-83,-84, was its leader. He was a delegate to the Republican National Convention of 1884 and in the same year removed to Medora, N. Dak., where he conducted a ranch for two years. As the Republican candidate for Mayor of New York in 1886, he opposed Henry George, Single-Taxer, and Abram S. Hewitt, Democrat, the successful candidate. From 1889 to 1895 he was a mem-

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ber of the United States Civil Service Commission, being appointed by President Harrison and retained by President Cleveland. In the latter year he became president of the Police Board in New York City and served for two years, attaining wide prominence by the energetic methods employed by him to eradicate evils existing in the system. President McKinley called him to national service in 1897, as Assistant Secretary of the Navy, and as such his work was of signal value in hurrying the navy to readiness for the war with Spain. In his desire for field service in the war he resigned from the department in April, 1898, and was active in organizing the First United States Volunteer Cavalry, popularly known as 'Roosevelt's Rough Riders.' He was first lieutenant-colonel and afterward colonel, being promoted for gallantry in the action at Las Guasimas, Cuba.

When his command was mustered out of the military service in the summer of 1898, Colonel Roosevelt returned to private life just in time to begin an active itinerant campaign as the Republican nominee for Governor of New York, which resulted in his election over Augustus Van Wyck, the Democratic candidate, by a plurality of 18,079. His first important act as Governor was to investigate the State canal system, concerning which there had been much talk of fraud in the preceding administration. The agitation of this question continued throughout his term, the net result being the appropriation by an unsympathetic Legislature of $200,000 for a new survey and an accurate estimate of the proposed improvements. Other conspicuous acts of the Governor were in connection with the enactment of the Ford Franchise Law, providing for the taxation of corporation franchises, whereby he incurred the enmity of some of the largest corporate interests; the extension of the civil service system to include many offices hitherto under the control of political influence; and the passage of the Davis Law fixing the minimum annual salary of school-teachers at $600, and providing for proportionate advances for length of service. With the approach of the State and national conventions of 1900, the position of Governor Roosevelt in the Republican party grew both interesting and involved. He had become a leading personality in the party, although hostile to some sections of it and dangerous to others, and was known to be ambitious. Against his expressed desire for a second term as Governor, in which to complete the reforms barely begun, he was nominated for Vice-President on the ticket with President McKinley, and was elected in November of the same year. On September 14, 1901, at the death of McKinley, Roosevelt became his successor. Shrewd political commentators had construed the nomination of Roosevelt for Vice-President as an intrigue of party leaders to insure his political extinction in that inconspicuous office. If such a plan existed, chance frustrated it by the death of President McKinley.

President Roosevelt conducted his administration as a continuation of McKinley's, of whose principles he was the avowed conservator. The plans for trust and tariff legislation were adhered to, particularly in reference to reciprocity treaties with other countries. The Philippine policy was maintained and a partially autonomous government was provided for the islands. Also, the construction of an Isthmian canal was authorized, and the connection of the Philippine Islands with the United States was accomplished by means of a submarine cable. All this was a heritage of the McKinley administration. Legislation identified more distinctively with Roosevelt himself dealt with the revision of the country's financial system, the increase of the navy as the best means of preserving peaceful relations between this and other powers, and the establishment of a permanent Census Bureau and of a Department of Commerce and Labor, whose Secretary is a member of the Cabinet. Of the personal side of his administration one instance is sufficiently characteristic—his action in the anthracite coal strike of 1902, when he called together representatives of both parties in the anthracite trouble and induced them to agree to the appointment of an arbitration commission. This was an act without precedent in the history of his office and was performed in the public behalf, to remedy a "national evil." So striking was the President's personality as to become the principal issue in the campaign of 1904. The Republican Convention in Chicago nominated by acclamation Mr. Roosevelt to succeed himself; and in the election of November he defeated his Democratic competitor, Judge Parker of New York, by a popular majority of nearly 2,000,000 votes. In the electoral college he received 336 votes to Judge Parker's 140. His second administration was marked by the same fruitful energy as had characterized the first. To his personal intercession and good offices was largely due the peace concluded at Portsmouth, N. H., between the envoys of Russia and Japan, in the summer of 1905. In 1906 his great influence led Congress to pass a bill aimed to check unfair discrimination in railway rates; and he also forced the enactment of a law to secure the purity of American food products. Personally, his popularity seemed to increase with every year.

Mr. Roosevelt is the author of numerous works: *The Naval War of 1812* (1882); *Life of Thomas Hart Benton* (1887); *Life of Gouverneur Morris* (1888); *Ranch Life and Hunting Trail* (1888); *History of New York City* (1891); *The Winning of the West* (4 vols., 1889-96); *Essays on Practical Politics* (1892); *The Wilderness Hunter* (1893); *American Political Ideals* (1897); *The Rough Riders* (1899); *Life of Oliver Cromwell* (1900); *The Strenuous Life* (1900); and *Hunting the Grizzly* (1905).

ROOT (AS., Icel. *rot*, root; connected with Lat. *radix*, Gk. ῥίζα, *rhiza*, Goth. *waúrts*, OHG. *wurz*, Ger. *Wurz*, AS. *wyrt*, Eng. *wort*). The underground part of vascular plants (pteridophytes and spermatophytes) which serves as an anchor in the soil and as an organ for absorbing water. Among the lower plants there are certain organs of attachment (rhizoids) which, though structurally unlike roots, may serve as such. Roots are variously classified. In duration they are annual, biennial, or perennial; in form they are fibrous or fleshy, and in origin they are primary or secondary. Primary roots, which are usually single, and if persistent are called taproots, originate from the embryo; secondary roots arise later from the shoot. As to structure and function roots are classified as follows: Soil roots are related to a soil medium and differ thereby from others; water roots are constructed for a water medium and may be developed by growing a terrestrial plant, for instance, a hya-

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cinth bulb, in water; air roots are constructed for an air medium, for instance, the dangling roots of an epiphytic orchid; clinging roots are organized for climbing, as in the ivies; prop roots are sent out to support wide-spreading branches to enable

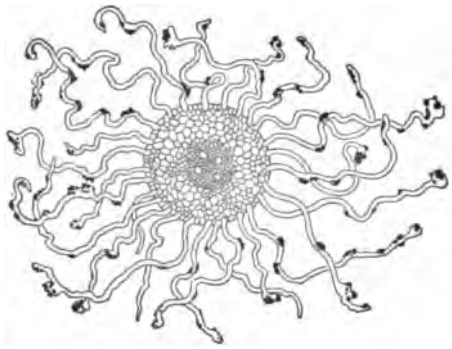

FIG. 1. CROSS-SECTION OF YOUNG ROOT. Showing root-hairs with adherent soil-particles.

them to spread farther, as in the screw-pine, banyan, etc. Unlike stems, roots bear no leaves or foliar structures, joints (nodes); do not increase in length by joints, but by continuous multiplication and enlargement of apical cells; and their branches arise from the central woody cylinder.

In minute structure roots are still more distinct from stems. (See HISTOLOGY.) In general the tips bear more or less conspicuous root-caps

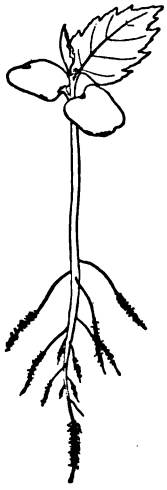

FIG. 2. PLANTLET. Showing roots and root-hairs.

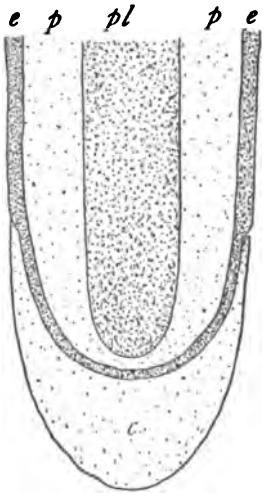

FIG. 3. DIAGRAM OF LONGITUDINAL SECTION OF ROOT-TIP. Showing dermatogen (*e*), periblem (*p*), plerome (*pl*), and root-cap (*c*).

composed of hood-like masses of cells, which die and slough off in front, and are renewed from behind (*c*, Fig. 3). This cap serves to protect the delicate growing tip as the root pushes its way through the soil. Just behind the root-cap are usually very numerous and delicate hairs, which are elongated outgrowths from the epidermal cells. They increase the absorbing surface of the root and are developed only in the activity absorbing region near the tip. As the rootlet lengthens new root-hairs appear near the tip, and the older ones perish (Figs. 1, 2). Just beneath the root-cap is the group of rapidly dividing apical cells, from which all the tissues of the root are derived. Just behind the apical group the three embryonic regions of the root begin to differentiate (Fig. 3). In the centre is the plerome, an axial mass of cells that tend to elongate. When fully organized this becomes the stele, in which originate the vascular bundles or main conducting strands of the root. Surrounding the plerome is the periblem, that later becomes the cortex, in roots a very prominent region. The cortex is covered by a single layer of cells, the dermatogen, that later becomes the epidermis. The dermatogen gives rise to the root-cap. In most roots also the epidermis behind the root-cap is replaced by a modified outer layer of the cortex, called the epiblema. Probably the chief anatomical peculiarity of the root is the central and solid woody axis, whose tissues are arranged in a way which distinguishes the root from most stems. Early in the history of perennial roots secondary changes occur, that greatly modify the general structure, especially in the appearance of growth rings, and assimilate it to that of stems. See HISTOLOGY.

ROOT. In philology (q.v.), that abstract form of a word which remains after all formative elements have been removed. In strict scientific discussion in Indo-Germanic linguistics a root is regarded as pre-Indo-Germanic; that is, it is a hypothetical word derived not only by omission of all formatives, but also by comparison of all cognate words in the Indo-Germanic languages. To speak of Greek, Celtic, or Germanic roots is, therefore, scientifically inaccurate. Roughly speaking *fōt* may be called the root of *foot*, but properly the root is the hypothetical Indo-Germanic form **pōd*, as shown by a comparison of Sanskrit *pāda*, Avesta *pāδa*, Armenian *otn*, Greek *πούς*, Doric Greek *πῶς*, Latin *pēs*, Lithuanian *padas*, Gothic *fōtus*, Old High German *fuoz*, and Anglo-Saxon *fōt*. In all probability roots never had an actual existence. Consult: Delbrück, *Einleitung in das Sprachstudium* (3d ed., Leipzig, 1893); Hirt, *Indogermanischer Ablaut* (Strassburg, 1900); Gabelentz, *Sprachwissenschaft* (Leipzig, 1901); Fick, *Vergleichendes Wörterbuch der indogermanischen Sprachen* (3d ed., Göttingen, 1874-76; 4th ed., 1890—); Persson, *Wurzelerweiterung und Wurzelvariation* (Upsala, 1891). See PHILOLOGY.

ROOT. In music, the lowest tone of any chord in its fundamental position. See CHORD; HARMONY.

ROOT. A number or expression resulting from the process of evolution. (See INVOLUTION AND EVOLUTION.) Also the values of the unknowns which satisfy an equation (q.v.) are called the roots of the equation.

ROOT, ELIHU (1845—). An American lawyer and administrator, born at Clinton, N. Y., where his father was professor of mathematics in Hamilton College, at which Elihu graduated in 1864. He began to practice law in 1867, forming partnerships with John N. Strahan in that year, with Willard Bartlett in 1876, and in 1886 with Samuel B. Clarke. Root was especially successful as a corporation lawyer and was counsel for the Sugar Trust, for New York street rail-

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ways, and for various railroad companies. His greatest prominence at the bar was due to his being retained as counsel for William M. Tweed in the "Tweed ring" trial; for Judge Hilton in the Stewart will case; and for Hamilton College in the Fayerweather will case. From 1883 to 1885 he was United States District Attorney in New York City. In 1899 he was appointed Secretary of War to succeed Russell A. Alger. In this capacity he planned the new War College and a modification of the rules of promotion, by which seniority ceased to be the sole claim. Another reform was the institution of the general staff. He continued in office during McKinley's second administration and under President Roosevelt until the summer of 1903, when he resigned and was succeeded by William H. Taft (q.v.).

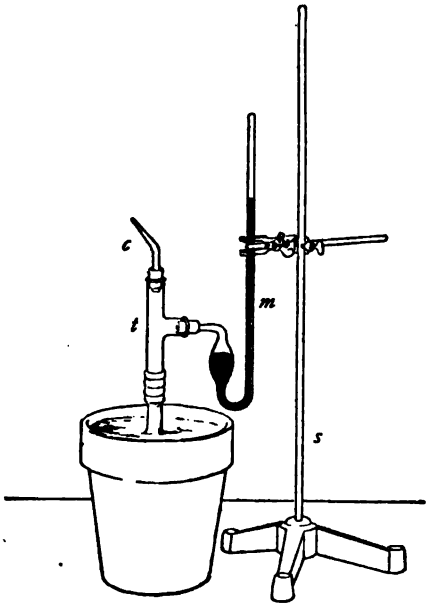
ROOT, George Frederick (1820-95). An American musician and composer. He was born at Sheffield, Mass., and studied music under George J. Webb of Boston, after which he taught music in New York City (1844-45), where he was organist of the Church of the Stranger. In 1859 he became a member of the Chicago music firm of Root & Cady. He composed many popular songs and battle songs, notably "Battle Cry of Freedom," "Tramp, Tramp, Tramp," "Just Before the Battle, Mother," and the quartet, "There's Music in the Air," besides which he edited numerous books of sacred music. Other works were the cantatas *Flower Queen* (1852); *Daniel* (1852); *The Pilgrim Fathers* (1854); *Belshazzar's Feast* (1856); and *The Haymakers* (1857).

ROOT BARNACLE. See Rhizocephala.

ROOT PARASITES. Plants attached to the roots of other plants, whose elaborated food they consume. They are usually without chlorophyll. In temperate climates the best known are probably broom rape and cancer root; in tropical countries, Rafflesia (q.v.). Many species of Scrophulariaceæ and the Indian pipe (*Monotropa uniflora*) are semi-parasitic.

ROOT PRESSURE. If while a plant is rapidly absorbing water by the root system, it be decapitated, water will soon ooze from the stump—a phenomenon known as bleeding. The amount may be measured and the pressure under which it escapes may be ascertained. Since the pressure thus determined was first recognized as arising in the root system, the name root pressure was given to it. Since investigation shows, however, that cells of suitable character, located in any part of the plant, under proper conditions may develop a similar pressure, the terms sap pressure and bleeding pressure are superseding it. Sap pressure is dependent upon the osmotic pressure (see Osmosis) of active cells which adjoin xylem bundles (see Anatomy), into which water escapes and travels to the point of exit under the pressure of additional quantities of water from behind. There is no satisfactory explanation of the action of the cells which thus force water into the xylem. Root pressure shows itself most strikingly in the spring before the leaves are fully developed, when the sap often exudes from wounds, as in grapevines and many trees, in considerable quantities. After the development of the foliage and under conditions which permit transpiration (q.v.), root pressure becomes less or disappears. It is, therefore, not an important factor in lifting water when water is most needed.

The amount of water which may escape is often much greater than the volume of the root system. Thus, in two and a half days, the stump of a stinging nettle gave off over eleven liters



APPARATUS TO MEASURE ROOT PRESSURE.
t, T-tube attached to stump of plant, filled with water and closed by sealing in flame the tip of *c*; *m*, a mercury pressure gauge connected with *t*, registering the force with which water is forced from the stump. *s*, a support.

(11 quarts) of water, more than eight times the volume of the root system. A twelve-year-old birch in seven days exuded from an opening in the trunk 36 liters of water. When the central bud is cut out, various species of century plant exude water several months. A vigorous plant is said by Humboldt to yield as much as 1000 liters. The extrusion of water from the sugar maple in late winter or early spring is at first not due to root pressure, but rather to the expansion of gases in the twigs which are warmed during the sunny days. See Sap.

ROOT TUBERCLES. Irregular swellings upon the roots of Leguminosæ, the alder, and a few other plants. They are due to an infection by various bacteria, or bacteria-like organisms. The ability of plants to assimilate the free nitrogen of the air was a subject of discussion among agricultural chemists for many years. Georges Ville seems to have been one of the first to maintain that certain plants can so assimilate, but he did not discover the true explanation. The claim of Ville was attacked by Boussingault, Lawes and Gilbert, and others, whose experiments seemed to give opposite results. Later Hellriegel (q.v.) proved, by carefully conducted experiments, that clovers and similar crops enrich the soil by adding nitrogen to it and that they obtain this nitrogen from the air, and subsequent studies show that the bacteria gain entrance through the root-hairs. The action is reciprocal; the plant furnishes the carbohydrates necessary for the growth of the bacteria, which,

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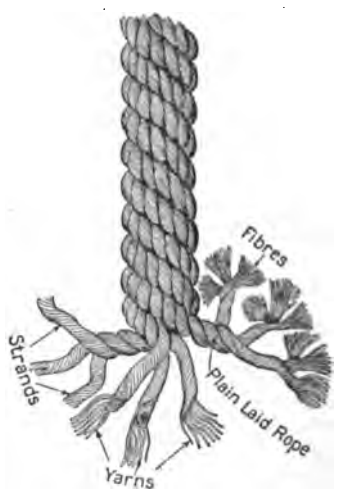
in turn, supply nitrogen to the host plant. (See SYMBIOSIS.) In this way if the soil contains sufficient available nitrogen for the maximum development of the plant, few tubercles will be developed, but well supplied with soil organisms, tubercles will be developed in abundance. The failure of Boussingault and others to observe any increase in nitrogen was due either to the absence of the micro-organisms or to a large amount of available nitrogen in the soil, since the organism (*Bacillus radicicola*) is not always present in the soil. Two means for securing them have been developed. One, called soil inoculation, consists in scattering soil rich in these organisms over a field to be planted, and the other in the use of cultures of the organisms distributed on the seed or over the soil. This last method is in some ways preferable and has resulted in the commercial preparation of a 'nitrogen.' See CLOVER; LEGUMINOSÆ; GREEN MANURING; NITROGEN.

ROPE (AS. *rāp*, Goth. *raips*, OHG. *reif*, cord, Ger. *Reif*, ring; of uncertain etymology). Technically, cordage one inch or more in diameter. The term cordage is used in a collective sense to include all sizes and varieties of cords and rope from harvester twine to the largest cables. It is probable that rope-making was among the very earliest of human industries. The materials first used for the purpose were probably the fibres of various plants, the inner bark of trees, and the hides of animals cut into thongs and twisted together. Sculptural representations of rope-making are found upon ancient Egyptian manuscripts, showing that they made use of flax and the fibres of the date tree as well as of rawhide. Herodotus states that the Persians manufactured cables 28 inches in circumference of flax and papyrus with which to aid in constructing the bridge of boats upon which the army of Xerxes crossed the Hellespont. Peruvians used fibres of the maguey for rope and twisted cables of sufficient strength to carry the primitive suspension bridges.

Prior to the year 1820, hand labor, aided only by the clumsy wheels and other imperfect contrivances pertaining to the old-fashioned rope-walk, was exclusively employed in the manufacture of rope. In that year some machines were constructed in England for twisting hand-spun yarn into strands, and a few were imported into the United States. The next step was the introduction of machines for spinning the threads from the raw material. The first machinery for this purpose was constructed in Massachusetts in 1834. American machines are now extensively employed in Europe, and American cordage is held in such high estimation that it is exported to all parts of the world.

MATERIALS. The materials employed for rope-making include hemp, flax, cotton, manila, sisal, jute, and other vegetable fibres. Russian hemp for tarred rigging has long maintained a reputation for superiority; its great strength and durability are attributed to the method of retting the fibre under water in lieu of the mode usually adopted with American hemp, called dew-retting. Italian hemp is also of excellent quality, and for some uses is unsurpassed. Manila hemp is perhaps more extensively used in the manufacture of cordage than any other material, as its great pliability and strength particularly adapt it for the running rigging of vessels and for a multiplicity of ordinary uses. Russian and American hemp are preferred for standing rigging, because they will absorb a great amount of tar and will withstand the weather without shrinking or stretching. Sisal, from Yucatan, and East Indian jute, are largely used for the manufacture of the cheaper grades of cordage. See FLAX; HEMP; JUTE; SISAL.

ROPE-WALK ROPE-MAKING. The old walk was usually from 1,000 feet to 1,400 feet long. Fibres of hemp were hackled or straightened out by drawing the material through a steel-toothed comb. The workman then wound a bundle of hemp about his body, attaching one end to one of a series of hooks on a 'whirl' or looper, drawing out the fibres from the bundle with one hand and compressing them with the other, experience teaching the number of fibres to draw out and how to twist them so as to hold firmly to the hook. He then walked slowly backward down the walk, making his yarn as he went, the spinning being done by the wheel or 'whirl' turned by an assistant, the spinner seeing that the fibres were equally supplied and joining the twisted parts at the ends. Two or more spinners might be going down the walk at the same time and at the end two would join their yarns together, each then beginning a new yarn and returning on the walk to the end where the second spinner again took his yarn off the 'whirl' and joined it to the end of the first spinner's yarn, so that it continued on the reel. When a sufficient number of yarns were spun they were twisted into strands and the strands into ropes, horse power being usually employed.



A CABLE-LAID ROPE.

The next improvement was the introduction of machines for twisting the yarn into strands and laying the strands into cables. The nature and operation of these machines can best be explained by describing a modern rope-walk plant, the reader taking care to remember, however, that, at first, hand-spun yarn was employed instead of the present machine-spun yarn. Most large rope, such as towing lines and ship cables, is walk-laid rope. The first operation is to wind the yarn on large bobbins. These bobbins are put on a framework of wood located near one end of the

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rope-walk and the ends of the yarns from them are passed through holes in an iron gauge plate, known as the face plate, and then through a cast-iron tube, which acts to collect the separate yarns into a closely laid cylindrical bundle. After being passed through the tube the yarns are fastened on a hook of the forming machine, which runs on a track the entire length of the walk, and which at the same time twists the yarns left-handed into a strand. To lay these strands into a rope, two laying machines are required, one at each end of the walk, which are known as the upper and lower machines. As many of the strands as are required for the rope are stretched at full length along the walk and are attached to the hooks on the laying machines. The upper machine has but one hook, to which all the strands are attached and which operates in one direction; while the lower machine has as many hooks as there are strands and operates in the opposite direction. To keep the strands equidistant they are placed in the grooves of a conical wooden block called a 'top,' which is attached to an upright post on a car called a top stud. The top is pushed up close to the upper laying machine at the beginning of the twisting process, and, as the twisting proceeds, the strands closing in behind it gradually force it down the walk until the lower laying machine is reached and the rope completed.

Machine Rope-Making. The greater part of medium-size rope is made by rope-making machines, as distinguished from the rope-walk. In describing rope-making by machines reference will be had particularly to the working of Manila hemp, the material most extensively used, but Russian, Sisal, and other hemps are manipulated in essentially the same manner. The treatment of jute requires a rather different process, owing to its shorter and weaker fibre. The bales of Manila hemp, averaging in weight about 270 pounds each, are opened, and, after the fibre has been lightly shaken apart, it is placed in layers which are sprinkled lightly with oil to soften and to lubricate the fibre previous to its passage through the machines. The first mechanical operation is called 'scutching,' and consists in passing the hemp over revolving cylinders bristling with sharp steel prongs or teeth, which straighten out the fibres and remove the coir, or fine broken particles, the dirt, and other foreign substances. It is then passed on to the breakers, which are large frames each about 25 feet long, consisting of two endless chains covered with long steel pins. The first chain feeds the fibres to the second, which runs much slower, the effect being to comb or straighten out the fibres and draw them into a continuous ribbon or sliver. Following this operation comes the passage of the hemp through the spreaders and drawing frames, machines similar to the breakers, but smaller, and furnished with steel pins and teeth of gradually increasing fineness, which still further comb and straighten out the fibres—a number of slivers being put together behind each machine and drawn down to one sliver again at the end of each machine. This drawing is repeated several times through machines of various degrees of fineness, in order to make the sliver even, without which it would be impossible to spin fine even yarns. This process is completed on a very fine drawing frame called a finisher, and from this the material emerges in complete readiness for spinning. The spinning is done on spinning machines or jennies, each operating two spindles, moving at about 1500 revolutions per minute. The spinning twists the fibre right-handed into yarn, about 1000 yards of which are wound upon each bobbin. The next process is to 'form' the yarn into strands and 'lay' the strands into rope, and this is performed upon machines known as formers and layers. For the larger sizes of rope there are usually separate machines, but for rope ½ inch in diameter and less the former and layer are combined into a single machine. The former consists of a circular iron disk, at the centre of which is erected a perpendicular shaft, carrying at its end a 'head' or die. The plane of the disk may be either horizontal or vertical. Around the edge of the disk are spaced several bobbins or spools full of yarn, the number of spools used depending upon the number of yarns in the final strand. The free end of the yarn from each spool is carried to the head, where, by a revolving motion of the disk, they are twisted together and wound off on to a spool or drum. If we substitute for the spools of yarn just described spools filled with twisted strands we have in its essentials a layer. When former and layer are combined, each spool on the large disk is replaced by a small disk and head, which twists a strand, the several strands being led to the head of the main disk and there twisted into completed rope, which is wound off on to a drum or reel.

Special Ropes. Cables for drilling oil and water wells have to be made unusually long and run all the way from 1,400 feet to 3,500 feet in length, and from 1⅞ inches to 2½ inches in diameter. They are composed of three strands of manila ropes, laid together with a very hard lay, so that they will not untwist when used for drilling, and also will resist the continual wear and rubbing against the side of the casing and the wall of the well. Cables of this kind are always made on machines and not in the rope-walk. These machines have to be exceedingly large and heavy to carry this amount of rope, and only a few mills in the world are equipped for making well-drilling cables. For making tarred rope the yarns are first run through copper tanks filled with heated tar; the yarns enter through holes in an iron plate and are drawn through the tank by machinery. As the yarns emerge from the tank the superfluous tar is removed by means of pressing rollers. Tarred rope may be made any size by the methods already described, but a large proportion of tarred yarn is made into small cordage.

Strength of Rope. The strength of rope varies with the material of which it is made, the weight of the rope per fathom, etc. The following figures compiled from Kent's *Mechanical Engineer's Pocket Book* (New York, 1900) give some general information on this matter:

Materials	Circ. in inches	Weight, lbs. per fathom	Strength, lbs.
Untarred hemp	1.53 to 6.9	0.42 to 7.77	1,670 to 33,808
Tarred hemp...	1.44 to 7.12	0.38 to 10.39	1,046 to 31,549
Cotton rope.....	2.48 to 6.51	1.08 to 8.17	3,089 to 23,258
Manila rope.....	1.19 to 8.9	0.2 to 11.4	1,280 to 65,550

The comparative strength of hemp, iron, and steel ropes is indicated in a general way by the

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following figures from Weisbach: Girth required to give tensile strength of 40 tons: Hemp, 12 inches; iron, 4⅝ inches; steel, 3¾ inches.

For a description of the manufacture of wire rope, see WIRE AND MANUFACTURES OF. For details of the strength and efficiency of rope and its application to transmission of power, see Kent, *Mechanical Engineer's Pocket Book* (New York, 1900), and Flather, *Rope Driving* (New York, 1895).

ROPES, ARTHUR REED (1859—). An English author best known for his comic operas. He was born in London, studied at King's College, Cambridge, and was Lightfoot and Whewell scholar in 1883 and fellow of King's from 1884 to 1890. He lectured on history at Cambridge and wrote a *Short History of Europe* (1889). He edited *Lady Mary Wortley Montagu's Letters* (1893), besides several modern language texts for the Pitt Press Series. Ropes's first comic opera, *Faddimir*, was produced in 1889. His other productions, entire or in part, include libretti for *Joan of Arc* (1891), *Go Bang* (1894), *A Greek Slave* (1898), *San Toy* (1899), *The Messenger Boy* (1900), and *The Toreador* (1901).

ROPES, JOHN CODMAN (1836-99). An eminent American lawyer and military historian. He was born in Saint Petersburg, Russia, where his father, a prominent Boston merchant, lived for some time; graduated at Harvard in 1857 and at the Harvard Law School in 1861; and in the latter year was admitted to the bar. In 1865 he became associated in practice with John C. Gray; from 1866 to 1870 was one of the editors of the *American Law Review;* and from 1878 until his death was head of the law firm of Ropes, Gray & Loring. Though an able advocate, he devoted himself largely to the care and management of trust estates. He early became interested in military history; founded the Military Historical Society of Massachusetts in 1876; and gained a wide reputation as a military historian. Besides a number of magazine articles, he published: *The Army Under Pope* (1881), in the "Campaigns of the Civil War Series;" *The First Napoleon* (1885); *The Campaign of Waterloo* (1892-93), probably the ablest monograph yet published on that subject; and *The Story of the Civil War* (2 vols., 1894-98), which was left unfinished, but is generally regarded as the best account yet produced of the military operations of 1861 and 1862 in the United States.

ROPEWAY. A line of rope or steel cable in which a carriage with grooved wheels is supported and carries a load. This carriage, with its burden, may be moved either by power or by gravity and the device is frequently employed in mining and other operations, especially for crossing valleys. Ropeways have been in use since the early part of the nineteenth century, but the idea is now more generally applied in the cableway (q.v.), where a load is not only transported, but is hoisted from any point on the line and delivered at any other desired point. Telpherage (q.v.) is also a further adaptation of the same principle.

ROPS, rô, FÉLICIEN (1833-98). A Belgian etcher, painter, and lithographer, born at Namur. His first drawings appeared in 1855, in the *Crocodile*, a Brussels publication, and a year afterwards he founded *Uylenspilgel*, in which several of his best lithographs were published. After this he was employed mainly in illustrating novels, and the cynical spirit, rare imagination, and often erotic subjects of these drawings have made his name widely and in many cases unfavorably known. His works rank with the highest for breadth, concentration, and sheer technical skill. His series of etchings known as the *Satiniques* are remarkable productions. His other works include several water colors. Consult: Ramiro, *Catalogue descriptif et analytique de l'œuvre gravé de Félicien Rops* (Paris, 1887-91); and Huysmans, *Certains* (Paris, 1887).

ROQUE. See CROQUET.

ROQUE, rôk, SAINT. See ROCH, SAINT.

ROQUEFORT, rôk'fôr'. A village in the Department of Aveyron, France, famous for its enormous production of cheese made from the milk of goats and sheep, and matured in the rocky caves of the Larzac cliffs (Map: France, J 8). Population, in 1901, 937.

ROQUETTE, rô'kĕt', OTTO (1824-96). A German poet, born in Krotoschin, Posen, of French descent. He studied at Heidelberg and Halle, and taught in the Darmstadt Polytechnic Institute from 1869 to his death. His first book was his greatest success, an allegoric tale in verse, *Waldmeisters Brautfahrt* (1851), which reached more than sixty editions before his death. Among his other poems, none of which approached the *Brautfahrt* in popularity, mention may be made of the *Liederbuch* (1852; 3d ed. 1880), which is in the Anacreontic manner; *Hans Haidekuckuck* (1885; 4th ed. 1894); and *Cesario*, a volume of narrative verse (1888). Besides several novels and dramas, Roquette wrote a *Geschichte der deutschen Litteratur* (1862-63; revised 1882). Consult the autobiography, *Siebzig Jahre* (Darmstadt, 1893).

RORAIMA, rô-rä'ê-mä, MOUNT. A remarkable mesa or flat-topped mountain-block situated at the common boundary point of Venezuela, Brazil, and British Guiana (Map: Brazil, E 2). From a sloping talus at the base the perpendicular rocky walls rise to a sheer height of nearly 3000 feet, though a sloping ledge on one side enables an ascent to be made to the summit, which has an altitude of 8740 feet above the sea. Several streams rise on the summit, and fall over the edges, forming the highest cascades in the world, the water being blown into a fine spray long before it reaches the ground.

RO'RER, SARAH TYSON (1849—). An American author, born at Richboro, Pa. She was educated at the East Aurora, N. Y., Academy, and became principal of the Philadelphia School of Domestic Science. She was editor and part owner of *Table Talk* from 1886 until 1892, and was an editor of *Household News* from 1892 until 1897, when she joined the staff of the *Ladies' Home Journal*. Her published works include: *Mrs. Rorer's Cook Book; Canning and Preserving; Bread Making; How to Use a Chafing Dish;* and *Good Cooking*.

RORIC FIGURES (from Lat. *ros*, dew). Images produced by breathing on glass or other polished surfaces which have been covered by some object. Moser of Königsberg, in 1842, discovered that when two bodies are in close proximity they receive impressions of each other's images, or, if a smooth surface has been touched by another body, it acquires a property of pre-

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cipitating vapors, which, by their action, cause an impression which gives to the surface a different appearance. These roric figures are called by the Germans *Hauchbilder*, or breath figures. Hunt and others have produced similar effects by heat. Gold, silver, and bronze coins and medals were placed on a polished heated copper-plate. After cooling, the coins or other objects were removed and the plate exposed to the vapor of mercury. The parts which had been covered by gold and silver coins gave the most distinct impressions, the gold more than the silver. These phenomena are explained by the fact that there is a molecular change in the surface in consequence of its having been for some time exposed to different external circumstances. Consult Müller-Pouillet, *Lehrbuch der Physik* (Brunswick, 1886).

RORQUAL (either from Swed. *rörhval*, round-headed cachelot, from *rör*, Icel. *reyrr*, Goth. *raus*, OHG. *ror*, Ger. *Rohr*, reed + *hvalr*, Icel. *hvalr*, OHG. *wal-fisc*, Ger. *Walfisch*, AS. *hwæl*, Eng. *whale*, or from Norw. *reydhrhval*, red whale, from Icel. *raupr*, Goth. *raups*, OHG. *rot*, Ger. *rot*, AS. *read*, Eng. *red* + *hval*, whale). A whale of the family Balænopteridæ, which includes whalebone whales of large size, differing from the right whales in the comparatively small head, the presence of a dorsal fin, and the fact that the throat is deeply ridged and furrowed lengthwise. The baleen is short. Many species of rorqual are known in various oceans, including the largest of known whales, such as Sibbald's, or the 'blue' whale, which reaches a length of 85 feet, the finner, the humpback, and the California gray whale, all of which are elsewhere described. The northern rorqual or razorback (*Balænoptera musculus*) is a slate-gray, whitish beneath. It is found in the Arctic seas. It is not easily captured; and whalers dislike it, because the Greenland whale is seldom found near it, while its own value is very inferior, owing to the comparative thinness of the blubber, and the shortness and inferior quality of the whalebone. It is, however, an important object of pursuit to the Laplanders and Greenlanders. This rorqual does not feed so exclusively on small prey as does the Greenland whale. Its gullet is much wider, and it preys much on fishes, the shoals of which it follows into bays and estuaries, devouring them in multitudes. Consult authorities cited under WHALE.

RO'RY O'MORE'. A novel by Samuel Lover (1836). Rory, a racy Irish peasant, cares for a sick French officer about the last of the eighteenth century, and is intrusted with important dispatches. On this errand he is involved in a fracas, and hurried off to France. He returns to find himself accused of murder, and is about to be hanged when his supposed victim appears. Lover also wrote a ballad on Rory O'More.

ROSA, rō'zà, CARL (1842-89). A German violinist and impresario, born at Hamburg. He studied in the conservatories of Leipzig and Paris; was concert-meister at Hamburg (1863-65), and on a tour of the United States in 1867 married Euphrosyne Parepa, the famous soprano. Together they formed an opera company, with Madame Rosa as its prima donna, which gave a great number of successful performances both in this country and in England. The Carl Rosa opera company was important principally for its creditable presentations of foreign operas in English.

ROSA, EDWARD BENNETT (1861—). An American physicist, born in Rogersville, N. Y., and educated at Wesleyan University, where he graduated in 1886, and at Johns Hopkins. He was appointed professor of physics in Wesleyan, made an especial study of electricity, and was associated with Professor Atwater of Wesleyan in experiments on the conservation of human energy in which a new and large form of respiratory calorimeter was employed. His publications include *The Specific Inductive Capacity of Electrolytes* (1892) and *Descriptions of a New Respiratory Calorimeter* (with Atwater, 1899).

ROSA, SALVATOR (1615-73). An Italian painter, etcher, satirical poet, and musical composer, the chief master of the Neapolitan School of Painting. He was born near Naples, June 20, 1615, the son of an architect. He studied music and poetry, before taking up painting under his uncle, Paolo Greco, and his brother-in-law, Fracanzano, a pupil of Ribera, whose school Salvator afterwards also frequented to study figures. Before he was eighteen he wandered about sketching in the mountainous regions and along the shores of South Italy, often falling in with the banditti, who appear so frequently in his pictures. Soon after his return to Naples the death of his father threw the support of the family upon his shoulders, and he painted small pictures at low prices until they attracted the attention of Lanfranco. He now also won the friendship of Falcone, the "Oracle of Battles," under whose instruction Salvator learned to paint battle scenes. In 1635 he went to Rome and found a patron in Cardinal Brancaccia, for whom he decorated his palace at Viterbo, returning thence to Naples. The favorable reception of his "Prometheus" (Palazzo Corsini) at Rome induced him to repair once more (1639) to the Eternal City, where he rapidly acquired fame as a poet, musician, and painter, and where his house became the gathering point of an admiring circle of young scholars, artists, and Church dignitaries. The story of his participation in the insurrection of Masaniello at Naples in 1647, and of his joining Falcone's "Compagnia della Morte," deserves little credence, although the fact of his presence in Naples at the time seems established. After another sojourn of four years in Rome, he incurred the enmity of the Inquisition by two satirical pictures, "Human Frailty" and "Fortune," and accepted the invitation to the grand ducal Court at Florence, where he spent nine years, enjoying with other friendships that of Lorenzo Lippi, in whose pictures Salvator painted the landscapes. He finally returned to Rome and remained there until his death, March 15, 1673.

The great ambition of Salvator Rosa was to excel as an historical painter, and some of his pictures, such as the "Conspiracy of Catiline" (Palazzo Pitti, Florence), "Saul and the Witch of Endor" (Louvre), the "Purgatory" (Brera, Milan), and "Jonah Preaching at Nineveh" (Copenhagen Gallery), go far to justify his aspiration. But his chief power lay in painting landscapes, marine views, and battle scenes, an admirable example of the latter being in the Louvre. His genius for landscapes was self-taught and original, preferring such subjects as the lonely haunts of wild beasts and robbers, rocky precipices and gloomy caves; his trees are shattered or torn up by the roots and the at-

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mosphere itself of a cheerless hue, only occasionally lighted up by a solitary sunbeam. Excellent specimens of this kind are "Mercury and the Dishonest Woodman" and "Forest Scene with Tobias and the Angel," both in the National Gallery, London. In his marines, of which a good example is the unique "Stormy Sea" in the Berlin Museum, he followed the same taste. He displays greater merit in landscapes of smaller dimensions, like those in the Gallery of Augsburg. In other works the landscape becomes subordinate, and the figures form the principal subject, a favorite theme being a "Warrior Doing Penance," of which the Vienna Museum contains a fine example. The "Selva dei filosofi," in the Palazzo Pitti, Florence, is of the same class. In his later Florentine period the influence of Claude Lorrain seems traceable in a few summer harbor views, exemplified by the large and splendid "Coast Scene" in the Palazzo Colonna, Rome. Salvator also painted excellent portraits; his own is in the Uffizi and in the Palazzo Pitti, Florence, and in the Dresden Museum, and he introduced it also into several of his pictures, notably in the "Poet and Satyr," in the Palazzo Chigi, Rome, and in the "Battle," in the Palazzo Pitti. He produced about ninety spirited etchings after his own designs. For his life, consult: Baldinucci (Venice, 1830) and Ignazio Cantù (Milan, 1844); also Regnet, in Dohme, *Kunst und Künstler Italiens*, iii. (Leipzig, 1879).

ROSA'CEA. See ACNE.

ROSA'CEÆ (Neo-Lat. nom. pl. of Lat. *rosaceus*, made of roses, from *rosa*, rose), or ROSE FAMILY. An order of at least 90 genera and 2000 species of dicotyledonous herbs, shrubs, and trees, chiefly natives of the cooler parts of the Northern Hemisphere, and among which are many species of great usefulness and beauty. It embraces the most important fruits of temperate climates, as the apple, pear, plum, peach, blackberry, raspberry, strawberry, and many ornamental plants such as rose, spiræa, mountain ash, etc. The fruit is various, as a drupe, pome, follicule, an achenium, a heap of achenia, or of one-seeded berries, etc. The order, as generally limited, is divided into a number of suborders, several of which have by some botanists been elevated to the rank of distinct orders, as Amygdaleæ, Pomaceæ, Sanguisorbeæ. The classification into suborders and chief genera as adopted by Engler is as follows: *Spiræoideæ*—represented by Spiræa, Quillaja, Holodiscus; *Pomoideæ*—with Pyrus; *Rosodieæ*—Rhodotypos, Kerria, Rubus, Potentilla, Fragaria, Geum, Dryas, Purshia, Ulmaria, Agrimonia, Poterium, and Rosa; *Neuradoideæ*—Neurada; *Prunoideæ*—Prunus, Nuttallia; *Chrysobalanoideæ*—Chrysobalanus, Hirtella. In addition to the grouping here given the genera are arranged in a dozen or more tribes. See ROSE; RUBUS; STRAWBERRY; AGRIMONY; SPIRÆA.

ROSALES, rô-sä'lâs. A town of Luzon, Philippines, in the Province of Pangasinán, situated on the Agno River, 24 miles southeast of Lingayén (Map: Luzon, D 3). Population, 11,519.

RO'SALIND. (1) The name under which Spenser, in the *Shepheard's Calendar*, refers to his early love, Rose or Rosa Daniel, who married John Florio. She is called Mirabel in the *Faerie Queene*. (2) In Shakespeare's *As You Like It*, the daughter of the banished Duke. She is herself banished, and, assuming male attire, lives with a companion in the Forest of Arden until Orlando meets her.

RO'SAMOND (c.1140-c.1176). The mistress of King Henry II. of England, usually known as FAIR ROSAMOND. She was the daughter of Walter de Clifford, and Henry II. seems to have first entered into relations with her about the year 1174. Little is really known about her, for the tale that she was secreted in the palace of Woodstock and that Queen Eleanor found her there and poisoned her is of late origin. She probably died in the nunnery of Godstow, in Oxfordshire. It is said that she had two sons by Henry II., William Longsword, Earl of Salisbury, and Geoffrey, Archbishop of York, but there is no proof of this. Late chronicles tell that she was buried before the altar in the church of Godstow, but that in 1191 Hugh, Bishop of Lincoln, caused the body to be removed to the chapter house and there reinterred.

ROSARIO, rô-sä'rê-ô. A city of Argentina, in the Province of Santa Fé, situated on the west bank of the Paraná, 175 miles northwest of Buenos Ayres, and 214 miles above that city along the river (Map: Argentina, E 10). It is substantially built, and has wide streets traversed by several lines of street railways. The chief importance of the city lies in its commerce. It is the centre of a considerable railroad system, and is the principal port and outlet for the products of all the northern provinces of the Republic. The river is navigable to this point for vessels drawing 16 feet, and transatlantic steamers load directly at the wharves. There are grain elevators. The chief exports are wheat, hides and other agricultural and cattle products, metals, and ores. These were valued in 1900 at $28,436,000, while the imports amounted to $9,301,000. Besides river craft, 682 ocean vessels with an aggregate of 1,027,353 tons entered the port in 1900. Rosario is the second city in size in the Republic. It has grown up almost entirely during the last half century. In 1850 it was an insignificant village of about 3000 inhabitants. In 1895 its population was 94,025, and in 1900, 112,461.

ROSARIO. A town of Luzon, Philippines, in the Province of Batangas. It lies about 12 miles northeast of Batangas and is connected by highways with all the larger places of the province (Map: Philippine Islands, F 6). Population, in 1896, 12,435. During the insurrection against the United States the town was completely destroyed by the insurgents.

ROSARY OF THE BLESSED VIRGIN MARY (ML. *rosarium*, garland of roses, chaplet of beads, neu. sg. of Lat. *rosarius*, relating to roses, from *rosa*, rose). The name given to a very popular form of prayer in the Roman Catholic Church. The name rosary has been variously traced either to the title "Mystical Rose," one of the titles under which the Blessed Virgin is addressed in the litany of Loreto (q.v.), or to Saint Rosalia's wreath of roses, well known in sacred art, or to the beads being originally made commonly of rosewood. The origin of the devotion itself is popularly traced to Saint Dominic, but it is quite certain that its characteristic feature, the use of beads as a means of reckoning the number of repetitions of a certain prayer, is of far greater antiquity. (See BEAD.) The same use of beads exists among the Mohammedans, but it

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SALVATOR ROSA

A MARINE PAINTING IN THE PITTI GALLERY, FLORENCE

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appears quite certain that the practice existed among Christians before the time of Mohammed. Originally, the prayer so repeated was the Lord's Prayer; but when, in the eleventh and twelfth centuries, the angelical salutation, "Hail Mary!" etc., became a frequent form of prayer, it was added to "Our Father"; and it seems beyond all doubt that the rosary in its present form was, if not devised, at least fully introduced and propagated by Saint Dominic. The repetition of these short and simple prayers is supposed to be accompanied by meditation on specific mysteries of the Christian faith, of which fifteen are named, though only five are usually taken up at one time. When recited publicly, the prayers are repeated alternately by the priest or other person presiding at prayer and by the congregation. The first Sunday in October is observed as the Feast of the Most Holy Rosary.

The mechanical instrument, so to speak, of this devotion is also called by the name rosary. It consists of a string of beads, equal in number to the "Our Fathers" and "Hail, Marys" which are recited in the rosary—the "Our Father" beads being of a larger size—one of which is passed through the fingers at each recitation of the prayer, and thus secures the person praying from errors of memory. The beads are blessed for the use of the people by the Pope, by bishops and superiors of religious Orders, and by others having special power for the purpose.

ROSAS, rō'sȧs, JUAN MANUEL (1793-1877). Dictator of the Argentine Confederation. He was born at Buenos Ayres and grew up among the gauchos on his father's estates. He entered the army, identified himself with the Federalist Party, and in 1829 rose to be Governor or Captain-General of his native State, then in federal union with Entre Rios, Corrientes, and Santa Fé. The predominant position which Buenos Ayres occupied among the Argentine States made Rosas the virtual head of the confederation. In 1832 he resigned, in order to conduct the war against the Indians, and was succeeded by Balcarce, who after three years was deposed. In 1835 Rosas caused himself to be invested with extraordinary powers in Buenos Ayres, and made himself dictator of the Argentine Confederation. He carried on relentless war against the chiefs of the party of the Unitarios, who favored a strongly centralized government, and against them, as well as all who opposed him, he did not hesitate to employ the weapons of torture and assassination. His sanguinary measures, however, gave the country peace, and with peace it attained to a fair degree of prosperity. The other States became jealous of the growth and power of Buenos Ayres, and Rosas was justly accused of a design to extend and uphold the undue predominance of his State, and to give his native city a monopoly of the trade of the river Plata. To extend his influence over Uruguay, which was a hotbed of opposition to him, he took up arms in behalf of Oribe (q.v.), and besieged Montevideo for a long period (1842-51). England and France interfered and in 1845 captured the Argentine fleet; yet Rosas succeeded in 1849 in obtaining terms of peace which were favorable to him. Finally Urquiza, Governor of Entre Rios, made war on Rosas and with the aid of the forces of Corrientes, Brazil, and Uruguay marched against him. A battle ensued at Monte-Caseros, February 3, 1852, in which Rosas's forces were put to flight. Rosas fled to England, where he died.

ROS'CELI'NUS, ROUSSELIN, rōōs'lăn', or **RUCELIN**, JEAN (c.1050-?). A French philosopher, the virtual founder of Nominalism. It is probable that he was born in Brittany, and was educated at Soissons and Rheims. He entered the Church and became canon at Compiègne, where he enunciated the doctrine that abstracts and universals are non-existent, being mere terms or names. Eric of Auxerre had held the same view three centuries before, and Martianus Capella in the fifth century practically forestalled Roscelinus, who, applying his theory to the Trinity, arrived at a tritheistic concept. In 1092 he was tried at Soissons and forced to recant after a discussion with Anselm, whom he had claimed as an ally. He lived for some time in England, then returned to France, became the teacher of Abélard, and charged his pupil with heresy when he not only failed to support his teacher's position in regard to the Trinity, but declared strongly for the orthodox views. Consult Picavet, *Roscelin, philosophe et théologien* (Paris, 1896).

ROSCHER, rō'shĕr, WILHELM (1817-94). A German economist, founder of the historical method in political economy. He was born in Hanover, studied in Göttingen and Berlin, became professor in the former university in 1843, and in 1848 was called to a chair in Leipzig. His *magnum opus* was a *System der Volkswirtschaft* in five volumes (1854-94), of which the first, which went through twenty-one editions during Roscher's life, was translated into English by Lalor (1878) under the title *Principles of Political Economy*. The second deals with agriculture and forestry; the third with trade and commerce; the fourth with finance; and the fifth with charities. This great systematic treatise was supplemented by the *Geschichte der Nationalökonomik in Deutschland* (1874) and by the monograph *Zur Geschichte der englischen Volkswirtschaftslehre* (1851-52). Roscher's other writings include: *Ueber Kornhandel und Teurungspolitik* (3d. ed. 1852); *Kolonien, Kolonialpolitik und Auswanderung* (3d ed. 1885); *Ansichten der Volkswirtschaft aus dem geschichtlichen Standpunkt* (3d ed. 1878); *Politik* (1892); and, posthumously published, *Geistliche Gedanken eines Nationalökonomen* (1894).

ROSCHER, WILHELM HEINRICH (1845—). A German classical mythologist, son of the economist Wilhelm Roscher. He was born in Göttingen, studied there and at Leipzig, and taught in the gymnasium at Wurzen, where he became rector in 1894. He traveled widely and became one of the foremost authorities on Greek and Roman mythology, winning especial notice by his treatment of myths of natural forces. He wrote: *Studien zur vergleichenden Mythologie der Griechen und Römer* (*Apollon und Mars*, 1873, and *Juno und Hera*, 1875); *Das Naturgefühl der Griechen und Römer* (1875); *Hermes der Windgott* (1878); *Die Gorgonen* (1879); *Selene und Verwandtes* (1890 and 1895); and *Ephialtes* (1900). Even more important is the *Ausführliches Lexikon der griechischen und römischen Mythologie* (1884 et seq.) under his editorial charge.

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ROSCIAD, rŏsh'ĭ-ăd (from Lat. *Roscius*, name of a famous Roman comedian), THE. A satire in verse by Charles Churchill (1761) on the London actors of that day. All but Garrick, Mrs. Pritchard, Mrs. Cibber, and Mrs. Clive were severely handled.

ROS'CIUS, QUINTUS (?-B.C. 62). The greatest comedian in ancient Rome. He was born at Solonium, a village near Lanuvium. Many of the Roman aristocracy befriended him, and the dictator Sulla, as a token of favor, presented him with a gold ring, the symbol of the equestrian order. Among his most admiring and affectionate patrons Roscius also numbered Cicero, who, at the commencement of his career, received lessons in the art of elocution from the great comedian. So sensible was Roscius of the distinction he enjoyed in sharing the intimacy of the great orator, that he came to look upon his art as one of no small importance and dignity, and wrote a treatise on the comparative methods and merits of eloquence and acting. Cicero's friendship was of use to him in another way, for on his being sued at law by C. Fannius Chærea for the sum of 50,000 sesterces (about $2000), Cicero defended him before the judex Piso (probably B.C. 68) in his extant oration *Pro Q. Roscio Comœdo.* He died B.C. 62.

ROS'COE, Sir HENRY ENFIELD (1833—). An English chemist, born in London, grandson of William Roscoe, the historian. He studied at the University of London and at Heidelberg, where, in association with Bunsen, he published several memoirs on chemical subjects. He was made professor of chemistry in Owens College, Manchester, in 1858, and Fellow of the Royal Society in 1863. He was one of the first to make exact measurements of the chemical action of light; for this and other valuable scientific achievement, he received, in 1873, the Royal Medal of the London Society. In 1896 he was made vice-chancellor of the University of London. Dr. Roscoe's published works include: a text-book entitled, *Lessons in Elementary Chemistry*, which has passed through many editions and been translated into several foreign languages; *Lectures on Spectrum Analysis* (1869; 4th ed. 1885); *John Dalton and the Rise of Modern Chemistry* (1895), etc. Jointly with Schorlemmer he published an exhaustive *Treatise on Chemistry* in 8 volumes (1877-98 and a later edition). He was one of the editors of Macmillan's series of Science Primers and himself wrote the *Primer of Chemistry.*

ROSCOE, WILLIAM (1753-1831). An English historian, born near Liverpool. In 1769 he entered the office of a Liverpool attorney, and in 1774 he began the practice of law. Meanwhile he diligently studied the classics and the Italian language and literature. In 1777 he published a collection of his verse, containing the first protest against the slave-trade, of which, throughout his life, he was a strenuous opponent. In 1796 was published the first volume of his *Life of Lorenzo de' Medici, Called the Magnificent.* This work proved very popular; several English editions appeared, and it was translated into German, French, and Italian. In 1805 appeared his second great work, the *Life and Pontificate of Leo X.* This work was received with much commendation, though its tone and spirit, especially with reference to the Reformation, was severely criticised. During the later years of his life he devoted himself much to the study of botany, and in honor of him a rare genus of monandrian plants received in 1826 the name *Roscoea.* Consult Henry Roscoe, *Life of William Roscoe* (London, 1833).

ROSCOE, WILLIAM CALDWELL (1823-59). An English poet and essayist. He graduated from the University of London (1843) and was called to the bar (1850). Owing to ill health, he soon retired to Wales, but he kept up his literary connection in London. His critical essays were written mostly for the *National Review*, edited by his brother-in-law, R. H. Hutton. They are still of interest. After experimenting with a drama called *Eliduc* (1846), founded on a *lai* of Marie de France, Roscoe produced a fine study in Elizabethan tragedy, *Violenzia* (1851), and wrote considerable occasional verse, some of which is beautiful. His finest powers are seen in the sonnet "To My Mother." Consult his *Poems and Essays*, with memoir by Hutton (London, 1860), and the reissue of the poems by his daughter, Elizabeth M. Roscoe (ib., 1891).

ROSCOM'MON. An inland county of Connaught, Ireland, bounded on the east by the river Shannon (Map: Ireland, C 3). Area, 949 square miles. The surface, which belongs to the central plains of Ireland, is level, with undulations rising in the south and on the north. The principal rivers are the Shannon (q.v.) and the Suck. The soil is fertile in the central district, which is known as the 'plain of Boyle' and which is celebrated for its sheep. Some portions produce good cereal crops; but the chief industry of the Roscommon farming population is the feeding of sheep and cattle, especially the former. The capital is Roscommon (q.v.). Population, in 1841, 254,550; in 1851, 174,570; in 1891, 116,552; in 1901, 101,640.

ROSCOMMON. The capital and assize town of Roscommon County, Ireland, 16½ miles west-southwest of Longford (Map: Ireland, C 3). Population, in 1901, 1891.

ROSCOMMON, WENTWORTH DILLON, fourth Earl of (c.1633-85). An Irish poet. He was born in Ireland and was the son of the third Earl of Roscommon and nephew of the Earl of Strafford. After the impeachment of his uncle he was sent to Caen, Normandy, where he was educated at the Protestant university. After the Restoration he held various Court positions, married a daughter of the Earl of Burlington, and devoted himself to literature. His works, commended by Johnson, and praised by Pope as the only pure writings of a dissolute reign, include an *Essay on Translated Verse* (1660); *Horace's Art of Poetry Translated into English Blank Verse* (1684); paraphrases of various psalms; a translation of *Dies Iræ*, and a collection of prologues and epilogues to plays. He was buried in Westminster Abbey.

ROSE (AS. *rōse*, from Lat. *rosa*, from Gk. *ῥόδον*, *rhodon*, Æolic *βρόδον*, *brodon*, rose; connected with Av. *varo da*, plant, Pahlavi *vartā*, Pers. *gul*, rose), *Rosa.* The popular name for a genus of plants of the natural order Rosaceæ, consisting of more or less erect climbing or trailing woody shrubs with odd-pinnate leaves. The flowers, borne solitary or in

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corymbs, are generally 'rose-colored.' In its natural state and in 'single' garden varieties the rose has five petals. The species, of which there are about 180, or according to some botanists only 30 or 40, are in some cases not well distinguished from varieties. Roses are natives of all the temperate parts of the Northern Hemisphere and thrive even in some of the colder regions. They have long been among the chief favorites in flower gardens. Countless single and double flowered varieties have been produced by cultivation by crossing and variation. These may be divided into two large classes, summer roses, or those blooming but once each year, usually in early summer, and perpetual or autumnal roses, which bloom more than once during the same season, many of them producing flowers continuously from early summer until late in the fall.

The summer roses include the Provence, damask and French, alba, Ayrshire, brier, multiflora, evergreen, and pompon garden groups. The Provence group consists of large-flowered varieties with a branching or pendulous growth and wrinkled leaf, and includes the moss, pompon, and sulphurea forms. The damask and French group presents firm and robust growing plants producing large flowers and downy leaves. This group includes the hybrid French, hybrid Provence, hybrid Bourbon, and hybrid China roses. The varieties of the alba group are large-flowered, have a free growth, and are spineless. The leaf is characterized by a whitish upper surface. The other groups of summer roses have small-flowered double or single blossoms. The Ayrshires are climbing varieties producing their flowers singly. The briers generally have a short-jointed growth and include the Austrian, Scotch, sweet, and Penzance briers, and the prairie and the Alpine roses. The multiflora group has a climbing growth and produces its flowers in clusters. This group includes some of the polyantha varieties. The evergreen group, including the sempervirens, Wichuraiana, Cherokee, and Banksian roses, is distinguished by its more or less shiny and persistent foliage. The pompons, as the name indicates, are of a dwarf growth.

In the summer and autumn flowering class the large-flowered groups comprise the hybrid perpetual, hybrid tea, moss, Bourbon, Bourbon perpetual, and China roses. All except the China group, which includes the tea and Lawrenceana varieties, have rough foliage. The small-flowered groups in this class include the musk, Ayrshire, polyantha, perpetual brier, and evergreen roses. The musk rose group, to which the noisettes belong, and the Ayrshire and polyantha groups have deciduous foliage and climbing habit. The perpetual briers, including the rugosa, lucida, microphylla, berberidifolia, and Scotch roses, are dwarf and bushy. The evergreen group in this class comprises the Macartney and Wichuraiana forms, in which the foliage is more or less persistent. The rose succeeds in warm, sunny, protected spots in most soils, but a friable, well-manured deep soil with a permeable subsoil is best adapted to the production of vigorous plants. Hybrid perpetuals prefer a strong, rich clay or loam, while tea roses are often grown in gravelly and sandy soil. Good drainage is always necessary. Roses are propagated from seeds, buds, layers, cuttings, and grafts. New varieties are grown from seeds. The most common method of propagation is by cuttings from nearly mature shoots which are started in sand under glass with low bottom heat. In budding the cultivated varieties are budded on manetti and multiflora stocks which are specially grown for this purpose in Europe. For grafting the stock used is Rosa Watsoniana, a Japanese species. Pruning in rose culture is practiced for the purpose of removing the dead wood, giving the plant a symmetrical form, and encouraging the development of flower buds.

Rose-growing under glass has become a very important industry. The three-quarter span rose house extending from east to west with the long span to the south is most in use. A moderately stiff loam taken from an old pasture, well rotted and pulverized, and mixed with about one-fourth its bulk of well-decomposed cow manure, makes a good soil for indoor rose culture. The benches should be four inches deep and well drained. The plants are generally kept in position by being tied to supports. The surface of the soil is very lightly stirred to kill all sprouting weed and grass seeds. Sometimes a light mulch of three or four parts of well-rotted cow manure and one part of soil is applied in August and again in January. During hot weather the temperature of the house is lowered by syringing several times a day and by the use of the ventilating arrangements. Ventilation is very beneficial and should be given whenever the weather permits. Propagation by cuttings is readily accomplished in rose houses because the conditions are all under control. Various varieties seem to require slightly different treatment, especially with respect to temperature. Such differences make necessary the separation of certain varieties. More than 100,000,000 cut roses are sold annually in the United States.

The influence of climate on rose culture is apparently greater than the influence of soil. A mild sunny climate is most favorable. The pleasant climatic conditions of Cannes and the Riviera in Europe and of southern California have made rose culture in those regions famous.

In landscape gardening the rose has a narrow range of application, since few species and

SWAMP ROSE (*Rosa Carolina*).

varieties retain their foliage well enough to be valuable in picture composition. The free-growing unsupported bushy forms are, however, often trained as pillars and the climbing sorts over

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trellises, walls, arches, arbors, etc. But it is as a cut flower that the rose is eminent; it is far more useful for personal adornment and house decoration than for beautifying the garden.

ROSE DISEASES. Among the diseases occurring on roses grown outdoors are: Leaf-blight (*Actinonema rosæ*), which produces black enlarging spots upon the upper surfaces of the leaves, which turn yellow and fall; leaf-spot (*Cercospora rosæcola*), which forms dark red or nearly black spots with distinct grayish-brown centres as they grow older; mildew (*Sphærotheca pannosa*), which checks the growth of the young shoots and dwarfs the leaves, while a white powdery growth covers the leaves and stunts the plants; and rust (*Phragmidium mucronatum*), which attacks all the green parts of the plant, causing reddish or yellow spots which increase in size until the leaves fall off. All diseased parts should be collected and burned and the plants well sprayed throughout the season with a clear fungicide (q.v.). Of these diseases, leaf-blight and mildew occur in greenhouses, and may be treated with powdered or evaporated (not burned) sulphur.

Consult: Bailey, *Cyclopedia of American Horticulture* (New York, 1900-02); Ellwanger, *The Rose* (ib., 1893); Hole, *A Book About Roses* (London, 1894); Jekyll and Mawley, *Roses for English Gardens* (ib., 1902); Hatton, *Secrets of Rose Culture* (Huntington, N. Y., 1891). A list of books in different languages on roses and their culture is given by Vergara in *Bibliografia de la rosa* (Madrid, 1892).

ROSE, ORDER OF THE. A Brazilian civil and military order of merit with six classes, founded in 1829 by Dom Pedro II. The medallion on the six-armed cross of white enamel bears the initials P. A. with the inscription *Amor e Fidelidade;* on the reverse are the date of foundation and the names *Pedro-Amelia* in reference to Pedro's marriage with Princess Amalie of Leuchtenberg. The ribbon is pink with two white stripes.

ROSE, CHAUNCEY (1794-1877). An American philanthropist, born in Wethersfield, Conn. He removed to the West in 1817 and settled in Terre Haute. He was active in promoting many industrial enterprises, chief among which was the building of the Indianapolis and Terre Haute Railroad. Having come into possession of his brother's estate, of the value of about $1,600,000, he resolved to carry out his brother's wishes expressed in a defective will by devoting the money to philanthropic enterprises. He gave large sums both from this estate and from his own fortune to schools, hospitals, asylums, and other charities in New York, Terre Haute, and elsewhere. His chief benefaction was made to the Rose Polytechnic Institute at Terre Haute, which he organized in 1874.

ROSE, GEORGE (1817-82). An English humorist who wrote under the pseudonym "Arthur Sketchley." He was born in London. After receiving his degree from Magdalen College, Oxford, in 1848, he took orders in the Anglican Church. In 1855 he went over to the Church of Rome. From 1858 to 1863 he was tutor to the Duke of Norfolk. Turning to literature, he produced several light comedies, which met with success. He became widely known for his numerous monologues on current topics purporting to be the views of Mrs. Brown, an illiterate old woman. They bore titles such as "Mrs. Brown's Visit to the Paris Exposition" (1867), on "The Alabama Claims" (1872), and on "Home Rule" (1881). They were begun in *Routledge's Annual* (1866), and continued in *Fun*. Rose traveled round the world, reading from these monologues. As a result of a visit to the United States (1867) he published the next year *The Great Country*. He also wrote two novels, *A Match in the Dark* (1878) and *A Marriage of Conscience* (1879). He died in London, November 11, 1882.

ROSE, rō'ze, GUSTAV (1798-1873). A German mineralogist, born in Berlin. He was a brother of Heinrich Rose, and, like him, studied in Berlin, and under Berzelius in Stockholm. He was appointed curator of minerals in the museum of Berlin University in 1822, professor in 1826, and director of the Mineralogical Museum in 1856. Rose accompanied Humboldt through Siberia in 1829, and, with Mitscherlich, examined Vesuvius and Etna in 1850 and the extinct volcanoes of Southern France in 1852. He attempted to show a close relationship between electrical polarity and crystal form, and therefore urged that the formation of crystals was in no way causally connected with physical surroundings. This system is set forth in his *Krystallochemisches Mineralsystem* (1852). His other works include: *Elemente der Kristallographie* (1833; continued by Sadebeck and Websky); *Beschreibung und Einteilung der Meteoriten* (1864); and *Kristallisation der Diamanten* (1876).

ROSE, HEINRICH (1795-1864). A German chemist. He was born in Berlin. He studied chemistry in Berlin, in Stockholm under Berzelius, and in Kiel, and became professor in Berlin in 1823. He devoted himself to analytical chemistry, and may be considered its founder. He made especial study of the rarer elements, was first to isolate many substances, and in 1844 discovered the metallic element niobium or columbium. Rose made valuable contributions to Poggendorff's *Annalen* and wrote a standard *Handbuch der analytischen Chemie* (1851, and after). Consult the biography by Rammelsberg (Berlin, 1866).

ROSE, HUGH HENRY, Baron Strathnairn. See STRATHNAIRN.

ROSE, HUGH JAMES (1795-1838). A Church of England theologian, and one of the founders of the Tractarian movement. He was born near London, at Little Horsford, educated at Trinity College, Cambridge; ordained deacon in 1818 and priest a year later; and became in 1818 curate of Buxsted, Sussex, and in 1821 of Horsham, Sussex; prebendary of Chichester, 1827-33; rector of Hadleigh, Suffolk, 1830, and of Fairstead and Werley in 1833, leaving the last for Saint Thomas, Southwark, 1837. In 1833 he was made professor of divinity in the University of Dublin, but ill health compelled his resignation the next year; in 1836 he became principal of King's College, London, but again ill health shortened his service, and he left England in October and died in Florence. He published *Christianity Always Progressive* (1829), *Notices of the Mosaic Law* (1831), *The Gospel an Abiding System* (1832). He was a fine Greek scholar; but his memory survives rather from his association with the great leaders of the Oxford Movement (q.v.) in its earlier stages. Consult his biography in Burgon, *Lives of Twelve Good Men* (London, 1888).

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ROSES

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1 MARÉCHAL NIEL
2 Mme DE WATTVILLE
3 PRINCESSE DE SAGAN
4 MUSK ROSE
5 LA FRANCE

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ROSE, Sir JOHN (1820-88). A Canadian statesman, born at Turriff, in Aberdeenshire, Scotland. He was educated in King's College, Aberdeen, and in 1836 emigrated to Lower Canada. In 1842 he was admitted to the bar in Montreal, quickly gained a large practice, and in 1848 was made Queen's counsel. In 1864 he was commissioner on behalf of Great Britain for the settlement of claims arising out of the Oregon treaty with the United States. Three years later he was returned to Parliament, and was Minister of Finance from that year until 1869, when he removed to England. In 1870 he was sent by the British Government to Washington on a mission relative to the *Alabama* claims. His efforts resulted in an informal convention, out of which grew the famous Treaty of Washington. He was created a baronet in 1872, and in 1886 became a privy councilor.

ROSE, JOHN HOLLAND (1855—). An English historian. He was born at Bedford and studied at Owens College, Manchester, and at Christ College, Cambridge. He graduated (B.A.) at Cambridge in 1879, and became lecturer on modern history to the Cambridge and London Societies for University Extension. Aside from numerous articles in the *English Historical Review* and the *Monthly Review*, his more important publications are *The Revolutionary and Napoleonic Era* (1894), *The Reign of Queen Victoria* (1897), *The Rise of Democracy* (1897), and *Life of Napoleon I., Including New Materials from the British Official Records* (1902), the last being up to the time of its publication the best balanced and most satisfactory life of Napoleon in English.

ROSE, rō'ze, VALENTIN (1829—). A German classical philologist and paleographer; son of Gustav Rose. He was born in Berlin, studied there and at Bonn, and at twenty-six entered the employ of the Berlin Royal Library, in which he became head of the department of manuscripts. He published a list of the Latin manuscripts in this library (1893, 1901 et seq.). He edited many classical works, especially on medicine, either before unedited or lacking critical treatment of the text. Among these are *Aristoteles Pseudepigraphus* (1863; 3d ed. 1886), *Anecdota Græca et Græcolatina* (1864-70), Vitruvius (with Müller-Strübing, 1867; 2d ed. 1899), *Anacreontea* (2d ed. 1876), *Anthimus* (1877), *Cassius Felix* (1879), and *Soranus* (1882).

ROSE, WILLIAM STEWART (1775-1843). An English poet and translator. He was educated at Eton, obtained a seat in Parliament (1796), and the position of reading clerk of the House of Lords (1800). Coming under the influence of the romantic revival, he published a verse translation of the first three books of *Amadis of Gaul* (1803), not directly from the Spanish original, but from Herberay's French version. The same year he made the acquaintance of Sir Walter Scott, who visited him at his villa of Gundimore on the Hampshire coast, and addressed to him the first canto of *Marmion*. In 1807 appeared a translation from the French of *Partenopex of Blois* and a ballad entitled *The Red King*, which were followed by two other ballads, *The Crusade of St. Lewis*, and *King Edward the Martyr* (1810). In 1817 Rose settled in Venice, where he began his well-known translation of Ariosto's *Orlando Furioso* (1823-31; reissued in Bohn's Library, 1858). His last publication was a volume of *Rhymes* (1837).

ROSE'BERY, ARCHIBALD PHILIP PRIMROSE, fifth Earl of (1847—). An English statesman. He was born in London, and was educated at Eton and at Christ Church, Oxford. He left college in 1868 before graduating, and took his seat in the House of Lords, having succeeded to the Earldom of Rosebery on the death of his grandfather, Archibald John Primrose. In Parliament he allied himself at once with the Liberal Party, and became an ardent supporter of Gladstone. In 1878 his marriage to Hannah Rothschild, daughter of Baron Rothschild, brought him powerful and influential friends in the financial world. In the same year he was made lord rector of Aberdeen University, and in 1880 he was chosen lord rector of the University of Edinburgh. In August, 1881, he accepted his first official appointment, that of Under Secretary of State for Home Affairs under Sir William Vernon Harcourt. His identification with the Gladstone Administration terminated in 1883, however, when he resigned as a result of the hostile criticism of some members of his party who objected to a peer holding such an office. Toward the end of 1884 he accepted the post of First Commissioner of Works, with a seat in the Cabinet. He left office with his colleagues in June, 1885. In the short-lived Ministry of Gladstone, which began in February, 1886, he held the office of Secretary of State for Foreign Affairs, and exhibited in the administration of that department unusual ability and skill. The years spent out of office succeeding the fall of the Gladstone Ministry Lord Rosebery spent in travel and study, adding greatly to his reputation as an orator and political leader. In 1888 he received the degree of LL.D. from Cambridge, and in 1889 was elected a member and the first chairman of the London County Council, holding office until June, 1890, and again for a few months in 1892. During a retirement in 1891, following the death of Lady Rosebery, he completed his *Life of William Pitt*, in the "Twelve English Statesmen" Series. Upon the return of Gladstone to power in August, 1892, Lord Rosebery again became Foreign Secretary. The principal features of his foreign policy were his insistence on British control in the Upper Nile Valley and Uganda, and his advocacy of the friendly policy subsequently adopted by Lord Salisbury in regard to the growth of the Japanese power in the Far East. In March, 1894, on the retirement of Gladstone, Lord Rosebery became Prime Minister. His personal popularity, however, did not avail to maintain his Ministry, and on June 24, 1895, the Government was defeated. On October 8, 1896, Lord Rosebery, finding himself opposed to the foreign policy generally adopted by Gladstone and other former leaders of the party, formally resigned his leadership. In the succeeding years he adopted the policy of 'plowing his furrow alone,' as he phrased it, holding aloof from Liberal politics. He supported Salisbury's stand in the Fashoda incident, and the prosecution of the war in South Africa, although as the war progressed he bitterly criticised its conduct, and urged the necessity of radical army reform. In addition to his *William Pitt* his principal published writings are: *Speeches 1874-96* (1896); *Sir Robert Peel*

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(1899); *Napoleon; the Last Phase* (1900); *Questions of Empire* (1900).

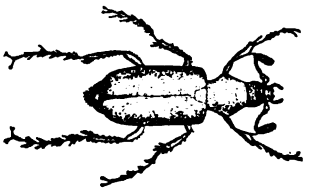
ROSECRANS, rō'ze-kränz, WILLIAM STARKE (1819-98). A distinguished American general, born at Kingston, Ohio. He graduated at West Point in 1842, entered the United States Engineer Corps, and served for a year as assistant to Colonel De Russey at Fortress Monroe. He then returned to West Point, where he served until 1847 as an assistant professor. In 1854 he resigned from the army and settled in Cincinnati, where he engaged in business as an architect and civil engineer. Upon the outbreak of the Civil War he was appointed colonel of the Twenty-third Ohio, and in June, 1861, became a brigadier-general in the Regular Army. He took part in General McClellan's West Virginia campaign as commander of a brigade of Ohio and Indiana troops, and on the 12th of July, 1861, won the battle of Rich Mountain. Shortly afterwards, when General McClellan was summoned to Washington, Rosecrans was put in command of the Federal forces in western Virginia. With them, on September 10th, he routed General Floyd at Carnifex Ferry, thus clearing the Kanawha Valley of the Confederates. In the following year he commanded the right wing of the Army of the Mississippi in the advance on Corinth, fought the battle of Iuka, September 19, 1862, and in October successfully defended Corinth against Generals Van Dorn and Price. On the 26th of the same month he relieved General Buell as commander of the Army of the Cumberland. He advanced upon Nashville, and on December 31st and January 2d defeated General Bragg in the battle of Murfreesboro, or Stone River. In the following June he moved into East Tennessee, and on September 19th and 20th was defeated by Bragg in the battle of Chickamauga (q.v.). The Federal army then fell back to Chattanooga, where it was besieged until relieved by General Grant. On October 23d Rosecrans was succeeded by Thomas, and after a short period of service in charge of the Department of Missouri he was relieved of all command. Concerning his military ability there has been much controversy. The weight of opinion, however, inclines to the view that "notwithstanding some faults of temper and military vacillation, General Rosecrans was undoubtedly a splendid fighter and a good strategist." Up to the time of the unfortunate battle of Chickamauga he had been uniformly and even brilliantly successful. At the close of the war he resigned from the army; in 1868 he served as Minister to Mexico; and from 1869 until 1881 devoted himself to railroad and industrial enterprises, mainly in Mexico. He was elected to Congress in 1880 and again in 1882, as a Democrat, and served as chairman of the Committee on Military Affairs. From 1885 to 1893 he was Register of the United States Treasury. In 1889 Congress passed an act restoring him to the rank and pay of a brigadier-general. For an account of his military campaigns, consult: Bickhorn, *Rosecrans's Campaign with the Fourteenth Army Corps* (Cincinnati, 1863); Cist, *Army of the Cumberland* (New York, 1882); Van Horne, *History of the Army of the Cumberland* (Cincinnati, 1875); Johnson and Buel (eds.), *Battles and Leaders of the Civil War* (New York, 1887); and Fiske, *The Mississippi Valley in the Civil War* (Boston, 1900).

ROSE FAMILY. See ROSACEÆ.

ROSEFISH, or REDFISH. A red scorpænid fish (*Sebastes marinus*) abundant on both coasts of the North Atlantic, and far into polar latitudes, where it becomes a shore and surface fish, while south of Newfoundland it is only found off shore and in deep water. In Greenland, Labrador, Iceland, and Scandinavia it is an important food-fish. In Nova Scotia it is called 'John Dory;' among various other names are 'snapper' and 'hemdurgan.' This fish is about 18 inches long and orange red in color, with a few dusky bars across the back. Consult Goode, *Fishery Industries*, sec. i. (Washington, 1884). See Plate of ROCKFISH, SUNFISH, ETC.

ROSEGGER, rō'zĕg-ĕr, PETER (1843—). An Austrian novelist, known for his descriptions of Styrian peasant life. He was born at Alpel, near Krieglach, in Styria. After a youth of poverty he was apprenticed at the age of eighteen to a tailor, but he gained by poetry patrons who enabled him to give himself to literature. *Zither und Hackbrett* (1870), poems in Styrian dialect, were well received and were followed by prose tales and sketches in dialect and in literary German. Of the latter the more noteworthy are *Volksleben in Steiermark* (1870), *Waldheimat* (1873), *Der Gottsucher* (1883), *Die Schriften des Waldschulmeisters* (1875, with an autobiographical preface, trans. as *The Forest Schoolmaster* by Francis E. Skinner, New York, 1901), *Jakob der Letzte* (1888), *Peter Mayr* (1893), *Erdsegen* (1900), and the autobiographic *Mein Weltleben* (1897). A popular edition of his works appeared at Leipzig (1895-1900).

ROSE INSECTS. The rose is eaten by many insects wherever it occurs. In Europe about 100 species are recorded as occurring upon this plant, including seven beetles, 55 lepidopterous larvæ, and 25 sawflies and gall flies. In the United States it is probable that fully as many species will be found. The most important of the American forms is the rose chafer (*Macrodactylus subspinosus*), which makes its appearance about the time the roses begin to bloom and strips the bushes, as well as grapevines and other plants, of the blossoms and foliage. The beetle is about one-third of an inch long, and is of a light yellowish color. It appears suddenly and in vast swarms in certain years, and overruns gardens,



ROSE CHAFER.
Adult female beetle (*Macrodactylus subspinosus*).

vineyards, and orchards. In about a month or six weeks from the time of their first arrival, and generally after having done a vast amount of damage, the insects disappear as suddenly as they came. The range of the rose chafer is from Canada and Maine southward to Virginia and Tennessee, and westward to Oklahoma and Colorado. The best remedies consist in plowing and cultivating the soil in the most favored breeding

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grounds, where these can be discovered. Against the adult beetles are used spraying with arsenical poisons, hand-picking, covering choice plants with netting, and the poisoning of early-flowering plants as trap crops; but the beetles appear in such enormous numbers day after day as to make these measures apparently hopeless.

The rose sawflies, larvæ of which are known as 'rose slugs,' frequently do considerable damage by skeletonizing the leaves. The bristly rose slug (larvæ of *Cladius pectinicornis*) has a wide distribution, feeding at first upon the lower side of the leaves and gradually eating irregular holes until nothing remains but the stronger ribs. They form their cocoons in the autumn, among fallen leaves and other rubbish upon the surface of the ground, and in the summer sometimes do so upon the branches of the plant. There are two or three generations annually. The curled rose slug (larva of *Emphytus cinctus*) is a European species which has been imported into the Northeastern United States. It eats the entire surface of the leaf, working along the edges, however, instead of gnawing holes. The American rose slug (larva of *Monostegia rosæ*) is the most prominent of the rose-sawfly larvæ. It is single-brooded, and the adults emerge in May about the time when the rose is in full leaf. The eggs are circular, and are inserted singly in the edge of the leaf. The larva is about one-third of an inch long, and is slug-like, the thorax being swollen. It feeds only at night and always upon the upper surface of the leaf, skeletonizing it rather than eating the entire substance. During the day it remains concealed on the under surface of the leaf. The larva becomes full-grown in about two weeks, abandons the plant and enters the soil, where it constructs a delicate earthen cocoon. In this it remains dormant until the following spring, transforming to pupa shortly before the emergence of the adult insect in May. All of these sawfly larvæ are readily destroyed by the application of powdered hellebore in a water spray.

The rose-bud worm is the larva of a tortricid moth (*Penthina nimbatana*). It usually feeds upon the leaves, but frequently bores into rose-buds before they have opened. The parent moth appears in the spring and lays its eggs at night. The larva grows rapidly, feeding upon the leaves or the buds, and reaches full growth by the end of May, the moth appearing early in June. The eggs of a second generation are then laid, and in the Southern States there may be a third. Another tortricid moth, the oblique-banded leaf-roller (*Cacœcia rosaceana*), is one of the most important of the leaf-rollers, and feeds upon many rosaceous plants. See LEAF-ROLLER.

Fuller's rose beetle (*Aramigus Fulleri*) is a weevil which feeds, when adult, upon the leaves, and in the larval stage works upon the roots. It is a well-known greenhouse pest of many plants in California, and made its appearance in the Eastern States as early as 1879. The adult beetle lays its eggs in flattened batches, thrusting them under the loose bark of the stem usually near the ground. The larvæ burrow into the ground and feed upon the roots, reaching full growth in the course of one or two months and passing the pupa stage also under the ground. The rose curculio (*Rhynchites bicolor*) is abundant and destructive in certain of the Western States; and several species of cutworms (q.v.) are also injurious to young rose plants.

Consult: Chittenden, *Bulletin 27*, new series, *United States Department of Agriculture, Division of Entomology* (Washington, 1901); also *Circular 11*, second series (ib., 1895).

ROSELLA (Neo-Lat. diminutive of Lat. *rosa*, rose), or ROSE PARRAKEET. A dealer's name, often spelled roselle, for one of the beautiful broad-tailed parrakeets of Australia (*Platycercus eximius*), remarkable for its rose-red plumage. In this species, which is common in captivity, the head, neck, and breast are rosy-red, the cheeks white, the nape yellow, the feathers of the back black, with greenish-yellow borders, the lower breast yellow, with a scarlet band in the middle, the wings largely blue, and the hind parts and tail yellowish-green. Its total length is 13.50 inches. It is distinguished from most other parrots by its cry, which is described as a kind of chattering or warbling.

ROSELLINI, rō'zĕl-lē'nê, IPPOLITO (1800-43). An Italian Egyptologist, born at Pisa. He studied at Bologna under Mezzofanti, and in 1824 was made professor of Oriental languages in the university of his native town. From 1825 he devoted himself chiefly to the study of Egyptology, and was the friend and pupil of J. F. Champollion, whom he assisted in his investigations at Rome, Naples, and Turin. In 1828 Rosellini was sent to Egypt at the head of a Tuscan expedition which, uniting with a French expedition under the direction of Champollion, spent fifteen months in exploring the monuments of Egypt and Nubia. The results of the expedition's work were published by Rosellini, after his return, in his *I monumenti dell' Egitto e della Nubia* (1832-44). Among his other works may be mentioned his *Elementa Linguæ Ægyptiacæ* (Rome, 1837), and his *Diccionario geroglifico*, which was left in manuscript, unfinished, at his death.

ROSELLY DE LORGUES, rō'z'-lē' de lôrg, ANTOINE FRANÇOIS FÉLIX (1805—). A French religious author, born at Grasse. He studied law at Aix and became an advocate, but deserted his practice to devote himself to literature. His chief publications are *Christophe Colomb* (1856), *Christophe Colomb le serviteur de Dieu* (1884), *Satan contre Colomb* (1876), and *Histoire posthume de Colomb* (1885), in which he claims that Columbus was directly inspired by God in his voyages, and that he should be canonized by the Roman Catholic Church. To this latter end he was made commissioner to the Holy See by the Queen Regent of Spain in 1893.

ROSEMARY (OF. *rosmarin*, *romarin*, Fr. *romarin*, from Lat. *rosmarinus*, *ros marinus*, rosemary, sea-dew, from *ros*, dew, and *marinus*, marine, from *mare*, sea; influenced by popular etymology with *rosa mariæ*, rose of the Virgin Mary), *Rosmarinus*. A genus of plants of the natural order Labiatæ. Only one species is known, *Rosmarinus officinalis*, an erect evergreen shrub of 4 to 8 feet high, with linear leaves and pale bluish flowers, growing in sunny places, on rocks, old walls, etc., in the Mediterranean region. It is generally cultivated as an ornamental and aromatic shrub. An essential oil, oil of rosemary, obtained from the leaves, is frequently used as a perfume and as a principal ingredient in Hungary water. Spirit of rose-

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mary, made by distilling rosemary with rectified spirit, is used to perfume lotions and liniments. Wild rosemary is Ledum palustre.

ROSEN, rō'zen, FRIEDRICH AUGUST (1805-37). A German-English Orientalist. He was born in Hanover, was educated at Göttingen and at Leipzig, where he devoted himself to the study of Semitic languages, and in 1824 went to Berlin, where he studied Sanskrit under Bopp, and in 1827 published his *Radices Sanscritæ*. He studied in Paris for a short time under De Sacy, and during 1829 and 1830 was professor of Oriental literature in University College, London. He translated and edited the oldest of extant Arabic mathematical works, *The Algebra of Mohammed ben Musa* (1831), during the next few years wrote a portion of the Oriental articles for the *Penny Cyclopædia*, undertook the revision of the Sanskrit-Bengali dictionary of Sir Graves Haughton (1835), and compiled for the British Museum the Catalogue of Syriac Manuscripts (1839), which was published after his death. In 1836 he had been reappointed professor of Sanskrit at University College and was busy preparing his collection of hymns of the *Rigveda*. Poverty and overwork hastened his end. His unfinished work on the Vedas was published by the Asiatic Society under the title *Rigveda-Sanhita, Liber Primus Sanscrite et Latine* (1838).

ROSEN, GEORG (1820-91). A German Orientalist and historian, brother of Friedrich August Rosen. He was born in Detmold, studied in Berlin and in Leipzig, and having attracted the attention of the Prussian Government by his *Rudimenta Persica* (1842), was sent with Koch to the East (1844). For thirty years he was in the German consular service, at Constantinople, at Jerusalem, and, until 1875, when he retired to his native city, in Belgrade. He wrote: *Ossetische Grammatik* (1846); *Tutinameh*, a translation of a series of Oriental tales (1858); *Das Haram zu Jerusalem und der Tempelsplatz des Moria* (1866); *Geschichte der Türkei 1826-56* (1866-67); *Die Balkan-Haiduken* (1878); and *Bulgarische Volksdichtungen* (1879).

ROSENBERG, rō'zen-bĕrk, ADOLF (1850—). A German art historian, born at Bromberg, Posen. After graduating in philology and archæology in Berlin, he studied art, traveling extensively, and in 1875 became associated with the editorial department of *Die Post* in Berlin. His writings comprise: *Sebald und Barthel Beham, zwei Maler der deutschen Renaissance* (1875); *Die Berliner Malerschule* (1879); *Rubensbriefe* (1881); *Die Münchener Malerschule* (1887); *Aus der Düsseldorfer Malerschule* (1890); *Geschichte der modernen Kunst* (2d ed. 1894); *Der Kupferstich in der Schule und unter dem Einfluss des Rubens* (1888). He also contributed largely to Dohme's *Kunst und Künstler* and to the series of monographs edited by Knackfuss. With Hugo Licht he published *Die Architektur Berlins* (Berlin, 1877) and *Die Architektur Deutschlands* (ib., 1878-82).

ROSENBUSCH, rō'zen-bŭsh, KARL HEINRICH FERDINAND (1836—). A German mineralogist, the practical founder of scientific petrography. He was born in Einbeck, Hanover, and studied at Freiburg. He was professor at Strassburg and then went to Heidelberg. There he became head of the Geological Institute in 1889. His great contributions to petrography have been a new classification and a wider use of the microscope. His chief works are *Mikroskopische Physiographie der Mineralien und Gesteine* (3d ed. 1892) and *Hilfstabellen zur mikroskopischen Mineralbestimmung in Gesteinen* (1888).

ROSENHEIM, rō'zen-hīm. A town in Upper Bavaria, situated on the Inn, 40 miles by rail southeast of Munich (Map: Bavaria, E 5). It has a number of interesting old churches and saline springs in the vicinity. Its chief manufactures are machinery, matches, cement, and metal articles. The trade is principally in wood. Population, in 1900, 14,246.

ROSENKRANZ, rō'zen-kränts, KARL (1805-79). A German philosopher, born at Magdeburg, and educated at Halle, where he subsequently was professor (1831-33). In 1833 he became professor at Königsberg. He belonged to the so-called 'centre' group of Hegelians. Besides his works in general literature he labored on a revision of Hegel's system. Among his works are *Psychologie* (3d ed. 1863); *Hegels Leben* (1844); *Goethe und seine Werke* (1847; 2d ed. 1856); *Die Poesie und ihre Geschichte* (1855); *Wissenschaft der logischen Idee* (1858-59). See Quäbicker, *K. Rosenkranz* (Leipzig, 1879).

ROSENTHAL, rō'zen-täl, ISIDOR (1836—). A German physiologist, born in Labischin, Prussia, and educated in Berlin. There he was assistant to Du Bois-Reymond in 1859-62 and docent in 1862-67. In 1872 he left the chair of physiology in Berlin to become professor at Erlangen, where he was long head of the Physiological Institute. He edited the *Centralblatt für die medizinischen Wissenschaften* (1869-80), the *Biologisches Centralblatt* (1881 sqq.), and the German edition of the "International Science Series" to which he contributed a volume, *General Physiology of Muscles and Nerves* (1881). His other works include: *Electricitätslehre für Mediziner* (1862); *Bier und Branntwein in ihrer Bedeutung für die Volksgesundheit* (1881; 2d ed. 1893); and *Vorlesungen über öffentliche und private Gesundheitspflege* (1887; 2d ed. 1889).

ROSENTHAL, MORITZ (1862—). An Austrian piano virtuoso, born at Lemberg. He studied under Karl Mikuli of Lemberg, Rafael Joseffy, and Franz Liszt. At the age of thirteen he gave concerts in Vienna, Warsaw, and Bucharest; but two years afterwards retired and studied at the University of Vienna. In 1882 he made successful concert tours throughout Europe, and in 1887 made his first tour of the United States, after which he achieved great success in the principal art centres of England, France, Germany, and Russia. In 1896-97 he made a second tour of the United States.

ROSENTHAL, TOBY EDWARD (1848—). An American figure painter, born in New Haven, Conn. He studied in San Francisco under Fortunato Arriola, and in Munich under Raupp and Piloty. Excepting occasional visits to America, he lived principally in Munich. His works are executed in a romantic, rather conventional style, with agreeable color. They include: "Morning Prayers in the Bach Family" (Leipzig Museum, 1870); "Trial of Constance de Beverly" (1883); "Elaine" (1876); and "Dancing Lesson During the Empire" (1886).

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ROSENTHAL-BONIN, Hugo (1840-97). A German novelist, born in Berlin. After studying there and in Paris philosophy and the natural sciences, he traveled extensively as a merchant, then settled in Switzerland and in 1871 at Stuttgart, where he became associate editor of *Ueber Land und Meer* and in 1889-94 edited *Vom Fels zum Meer*. His best known novels include: *Der Bernsteinsucher* (1880), *Die Thierbändigerin* (1884), *Schwarze Schatten* (1884), and *Das Haus mit den zwei Eingängen* (1888). The collections of stories *Der Heiratsdamm und Anderes* (1876) and *Unterirdisch Feuer* (1879) were translated into most of the European languages.

ROSE OF JERICHO, Resurrection Plant (*Anastatica hierochuntica*). A small Arabian herb of the natural order Cruciferæ. After flowering the leaves fall off, and the branches become incurved toward the centre, so that the plant becomes almost globular. In this state it is often blown about by the wind. When it happens to be blown into water, the branches expand again, the pods open and let out the seeds. If taken up before it is quite withered, the plant retains for years its hygroscopic property of contracting in drought and expanding in moisture.

ROSE OF JERICHO.
d, Dried condition.

ROSE OF LIMA, Saint (1586-1617). The first American saint. She was born at Lima, Peru, April 20, 1586, and from an early age gave herself to a life of extraordinary austerities and self-mortifications. At the age of 20 she took the veil as a sister of the Third Order of Saint Dominic. She died at Lima, August 24, 1617. In 1669 she was named patron of "America and the Indies," and was canonized by Clement X. in 1671. Her day is August 30. The chief source for her life is the *Vita Sanctæ Rosæ* by the Dominican Hemsen (German trans., 2d ed., Regensburg, 1863).

ROSE OF SHARON. A name variously applied to the autumn crocus (*Colchicum autumnale*), to Polyanthus Narcissus (*Narcissus Tazetta*), and, in America, to the Syrian hibiscus (*Hibiscus syriacus*). See Crocus; Narcissus; Hibiscus.

ROSE'OLA (Neo-Lat., from Lat. *roseus*, rosy, from *rosa*, rose). A name given to an eruption accompanying several diseases, such as erythema and German measles or rubeola. There is a *roseola ab ingestis* which is due to intestinal or gastric disturbances, and which resembles very closely the eruption of scarlet fever.

ROSE POLYTECHNIC INSTITUTE. A school of engineering at Terre Haute, Ind., founded in 1874 by Chauncey Rose (q.v.) and opened in 1883. Five parallel courses of study are offered, in mechanical, electrical, and civil engineering, architecture, and chemistry, each occupying four years. The five courses are identical during the first term of the freshman year, after which each student must elect between two groups. The degree of Bachelor of Science is conferred on all graduates, and that of Master of Science for at least one year's graduate work. The degree of Mechanical, Electrical, or Civil Engineer is granted to holders of the Master's degree, after two years in the practice of their profession. In 1903 there were 205 students and a faculty of 20 instructors. The institute occupies ten acres and has four buildings, valued with the grounds at $185,000. Its library contained 11,000 volumes. The productive funds amounted to $600,000, and the gross income was $50,000.

ROSE QUARTZ. A variety of quartz, usually crystallized, but sometimes found massive. It has a delicate pink or flesh color, due to the presence of minute quantities of manganese or titanium oxide. It is valued as an ornamental stone, and the larger pieces are made into vases, while the smaller fragments are used for jewels, seals, etc. The variety possessing a bright red color is sometimes called 'Bohemian ruby.'

ROSES, Wars of the. The series of civil wars in England between the rival houses of Lancaster and York in the latter half of the fifteenth century. The struggle owed its name to the fact that the badge of the House of Lancaster was a red rose, and that of the House of York a white rose. The House of Lancaster had obtained the throne of England in 1399 by an act of Parliament, which had deposed Richard II. and given the crown to his cousin Henry IV. During the reigns of Henry IV. and Henry V. there was no open discontent, for the country was prosperous and under the latter King the military successes in France pleased the national pride. But when Henry V. died in 1422 he left as heir a child of nine months, Henry VI., who, when he grew to manhood, proved to be weak physically and mentally. Moreover, the country was exasperated by the loss of the French possessions (see Hundred Years' War), and the poor were in dire distress on account of the excessive taxation. Under such circumstances the people began to look to Richard, Duke of York, who, descended from Lionel, the second son of Edward III., had, if hereditary right was to be regarded, better claims to the throne than Henry VI., descended from John of Gaunt, the fourth son of Edward III. The first armed demonstration was Jack Cade's Rebellion (1450), which began in Kent and was directed against the favorites of Henry VI. The chief demand of the insurgents was that the government should be placed in the hands of the Duke of York. This rising was easily suppressed, but in 1453 Henry VI. became insane, and in 1454 the Duke of York was declared Protector. Henry VI., however, soon recovered his reason, and

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York, fearing destruction, took up arms. In general the North was Lancastrian, while the South (especially London) sided with the Yorkists. In 1455 the first battle of the war took place at Saint Albans. York was victorious, and when, shortly after, Henry again became insane, the Protectorate was reëstablished. In 1456 the King recovered his reason and the Duke of York resigned. Meanwhile, however, the Earl of Warwick, the most powerful supporter of the Yorkists, continued in rebellion, until in 1460 the strife again became general. The royal army was defeated at Northampton and the King captured, and Parliament declared Richard heir to the crown, thus excluding Edward, the son of Henry VI. This last action aroused the Queen, Margaret of Anjou (q.v.), and she collected an army in the North. On December 31, 1460, the Duke of York was defeated and slain at Wakefield. His successor was his son, Edward, Earl of March, who on February 2, 1461, defeated some Lancastrian forces at Mortimer's Cross. Meanwhile Margaret was advancing on London, and on her way defeated Warwick in the second battle of Saint Albans on February 17th, and released Henry, who had been in Warwick's hands. Edward hastened to London, and on March 2, 1461, assumed the crown as Edward IV. On March 29th the decisive battle of Towton was fought. Edward was completely victorious, and Margaret fled with Henry to Scotland.

Since nearly all the great nobles were Lancastrians, Edward IV. sought to conciliate the Commons, and increased their privileges. The civil strife for a while went on in a desultory way. In 1462 Margaret was again in Northern England, but in 1464 Warwick's brother, Lord Montague, defeated her at Hedgeley Moor and Hexham, and in 1465 Henry was captured and thrown into the Tower. Suddenly in 1469 Warwick, hoping to obtain still greater power, deserted Edward IV. for Henry VI. His followers were defeated at Stamford, but Warwick fled to France, and there obtained aid from Louis XI., and with his new forces landed in England. Edward IV. escaped to Holland, and Henry VI. was taken from the Tower and replaced on the throne. But Edward soon returned and on April 14, 1471, won the battle of Barnet, in which Warwick and Montague lost their lives. On May 4th Margaret was defeated at Tewkesbury, and her son was slain after the battle, while shortly after Henry VI. was probably murdered in the Tower, whither he had been taken after the battle of Barnet.

The battle of Tewkesbury ended all effective resistance to the Yorkist rule until the reign of Richard III. (q.v.). His unpopularity enabled the Duke of Richmond, the head of the House of Lancaster, to invade England in 1485. On August 22, 1485, Richard III. was defeated and slain at Bosworth Field, and Richmond became King as Henry VII. (q.v.). On January 18, 1486, Henry married Elizabeth, the daughter of Edward IV. and heiress of the Yorkist family. Thus the rival dynasties were united. The chief results of the Wars of the Roses were the extirpation of the ancient nobility and the reduction of Parliament to the position of a tool of faction. This rendered possible the despotism of the Tudors. A good compendium of the whole subject will be found in Gairdner, *The Houses of Lancaster and York* (6th ed., London, 1886). The fullest and best work is Ramsay, *Lancaster and York, 1399-1485* (Oxford, 1892). Consult also Kriehn, *The English Rising in 1450* (Strassburg, 1892).

ROSETTA, rō-zĕt'tà (Ar. *Er-Rashid*). A town and port of Northern Egypt, in latitude 31° 25′ N., on the west bank of the Rosetta branch of the Nile, and about four miles from the mouth of the river. It is the modern representative of the ancient Bolbitine, which lay a little farther north. In the Middle Ages Rosetta was a place of considerable commercial importance, and it continued to flourish until the construction of the Mahmudiyeh Canal and the improvement of the harbor of Alexandria diverted most of its trade to the latter city. Rosetta still has thriving manufactories of sailcloth, leather, and iron, and exports a considerable quantity of rice, linseed oil, and oil of sesame. The population numbers about 14,000. See ROSETTA STONE.

ROSETTA STONE. A slab of black basalt bearing an inscription which was the key to the interpretation of Egyptian hieroglyphics. It was found in 1799 by M. Boussard, a French officer of engineers in the trenches at Fort Saint Julien, near Rosetta (q.v.), and is now in the British Museum. The upper portion and the lower right-hand corner have been broken away and in its present condition it measures 3 feet 9 inches in height, 2 feet 4½ inches in breadth, and 11 inches in thickness. Upon it is inscribed in hieroglyphics, in demotic writing, and in Greek, a decree of the Egyptian priesthood, assembled at Memphis, in honor of Ptolemy V. Epiphanes (B.C. 205-181). It is dated March 27, B.C. 195, and, after reciting the numerous benefits conferred by Epiphanes upon his country as well as upon the temples and the clergy, provides that the King's statue shall be placed in the sanctuary of every temple, and that divine honors shall be paid to him. It is further provided that a copy of the decree, inscribed upon a stele of hard stone, shall be placed in every temple of the first and second rank. The Greek version of the decree, containing 54 lines of text, is well preserved, though the ends of some of the lines are broken away. Of the hieroglyphic inscription, 14 partly mutilated lines, constituting about half the text, remain, while the demotic text (32 lines) is almost entire. The Rosetta stone, by placing in the hands of scholars two long Egyptian texts, representing different periods of the language, together with a Greek translation, furnished the means whereby a knowledge of the long-lost tongue of ancient Egypt was regained, and thus opened the way for the great achievements of modern Egyptology. (For an account of the work of decipherment, see EGYPTOLOGY.) Another trilingual inscription, containing a similar decree in honor of Ptolemy III., Euergetes I. (B.C. 247-222), was found at Tanis in 1866, and has served to confirm the methods and results of Champollion and his followers. Consult: Letronne, *Inscription grecque de Rosette* (Paris, 1840); Brugsch, *Die Inschrift von Rosetta* (Berlin, 1850); *Report of the Committee Appointed by the Philomathean Society of the University of Pennsylvania to Translate the Inscription on the Rosetta Stone* (Philadelphia, 1858); Chabas, *L'inscription hiéroglyphique de Rosette* (Paris, 1867); Sharpe, *Rosetta Stone in Hieroglyphics*

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and Greek (London, 1871); Budge, *A History of Egypt* (New York, 1902).

ROSETTI, rō-sĕt'tē, KONSTANTIN (1816-85). A Rumanian poet and politician, born at Bucharest. He served in the army and was afterwards employed in the Government service, devoting himself at the same time to literary pursuits. Voltaire, Lamartine, and Byron were translated into Rumanian for the first time by him. He took a prominent part in radical agitation, was a member of the Revolutionary Committee in 1848, and held several public offices. In 1850 his journal, *Prunoul român*, was suppressed. He was Minister of Education in 1866, became president of the Chamber of Deputies in 1877, and was Minister of Interior in 1881-82. During his last years he was editor of *Romanul*. He published one volume of original verse, *Ceasuri de multumire* (1840). His collected works appeared at Bucharest in 1885.

ROSE WATER. See PERFUMERY.

ROSE WINDOW. A large circular window, usually with tracery and stained glasses, used especially in Gothic churches over the portals. See WINDOW.

ROSEWOOD. The commercial name of the wood of several trees, valued for beauty, and used for ornamental furniture. The principal species is thought to be a Brazilian Mimosa. Several species of Dalbergia, of the natural order Leguminosæ, are also believed to be rosewoods, but in general the botanist is still doubtful, although various kinds of rosewood, imported from South America, are much used for veneering, in making furniture, musical instruments, etc. Rosewood has for a long time been second only to mahogany as a furniture-wood. It varies in color from reddish brown to purple or almost black, often beautifully marked with streaks of dark red. When being sawn or cut it yields an agreeable smell of roses, hence its name. The name rosewood has been given also to kinds of timber grown in Jamaica, in Africa, and in Burma. One valuable kind of rosewood is yielded by an East Indian tree, Dalbergia latifolia, also called blackwood. It is found chiefly in Malabar, and grows to a height of about 50 feet. The increasing value of the wood has led to the formation of new plantations, under the care of the Government conservator of forests, in several parts of the Madras Presidency. The value of rosewood depends upon its coloring, the usual price being from $50 to $90 per ton, though exceptional specimens have sold as high as $450 per ton. The principal supplies come from Brazil, the Canary Islands, East Indies, and Africa. In Australia the name rosewood is applied to the timber of Eremophila Mitchelli, Dysoxylum Fraseranum, and Acacia glaucescena, all of which are close-grained, dark-colored, and pleasantly scented. The genera Pterocarpus and Machærium also supply rosewood.

ROSICRU'CIANS (ML. *Rosicrucianus*, from Lat. *rosa*, rose + *crux*, cross, Latinized from Ger. *Rosenkreutz*, Rose-Cross, the name applied to the society either on account of the emblem and pseudonym adopted by Johann Valentin Andreæ, erroneously regarded as the founder or restorer of the order, or because of the titles 'Brothers of the Rosy Cross,' 'Rosy Cross Knights,' and 'Rosy Cross Philosophers,' assumed by the society; sometimes supposed to be a corruption of *Rosoicrucian* or *Roricrucian*, from Lat. *roscidus*, dewy, from *ros*, dew + *crux*, cross, since mediæval alchemists considered dew the most powerful solvent of gold, and the cross the synonym of light). The members of secret societies, professing to be philosophers, but in reality charlatans, who in the seventeenth and eighteenth centuries made themselves conspicuous by claiming to be possessed of secrets of nature, including the power to transmute the baser metals into gold; to prolong life by the use of the *elixir vitæ;* to have a knowledge of passing events in distant places, and to discover hidden things by the application of the Cabbala (q.v.). Rosicrucianism stood in some connection with freemasonry, and owed its vogue in the eighteenth century to the passion for secret associations and for a pseudo-science which had not yet freed itself from the absurdities of alchemy and found expression in such forms as mesmerism, etc. This was the age, too, of great impostors, who laid claim to supernatural powers, such as Cagliostro and the Count of Saint Germain (qq.v.). See ANDREÆ, JOHANN VALENTIN.

ROSIN (variant of *resin*, OF. *resine*, Fr. *résine*, from Lat. *resina*, resin, probably from Gk. 'ρητίνη, *rhētinē*, pine-resin), or COLOPHONY. A well-known substance which remains behind when common turpentine is subjected to distillation with water. It is hard and transparent, and has a faint odor like that of turpentine. It is soluble in alkaline hydroxide solutions as well as in alcohol, ether, and carbon disulphide. Its chief constituent is the anhydride of abietic acid. Colophony is used mainly in making varnishes and rosin soap, and is one of the constituents of basilicon ointment and of adhesive plaster. See RESINS.

ROSINANTE, rō'sē-năn'tē. The lean, raw-boned steed of Don Quixote.

ROSIN WEED. See SILPHIUM.

ROSLAVL, rōs-läv'ly'. A town in the Government of Smolensk, Russia, 73 miles southeast of Smolensk (Map: Russia, D 4). Its chief manufactures are oil and tobacco. Population, in 1897, 17,848.

ROSLIN, rōz'lĭn, **ROSLYN,** or **ROSSLYN.** A village of Edinburghshire, Scotland, overlooking the beautiful valley of the North Esk, 4½ miles southwest of Dalkeith. It is famous for its collegiate chapel, dating from 1450, and commemorated in Sir Walter Scott's ballad of *Rosabelle*. The chapel is one of the most prob[illegible]ly decorated specimens of Gothic architectur[illegible]tant. It is now used as an Episcopal church.

ROSMINI-SERBATI, rōs-mē'nē sĕr-bä'tē, ANTONIO (1797-1855). An Italian philosopher and founder of a religious Order. He was born at Roveredo, near Trent, in Tyrol. He became a priest in 1821 and in 1828 he founded a religious Order called the Institute of Charity, whose members, known as Rosminians, were to devote themselves especially to preaching and education. During the troublous times in 1848 Rosmini was an adviser of Pope Pius IX. He was in sympathy with the national idea and looked forward with enthusiasm to a united Italy. He was influenced by Gioberti (q.v.), who was at that time a member of the

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Piedmontese Ministry. With the rising influence of Cardinal Antonelli, Rosmini lost the favor of the Pope. His work on Church reform, called *The Five Wounds of the Church* (1848), and his tract *The Constitution According to Social Justice* (1848), were put upon the Index. His works (which are published in 35 volumes) aroused much discussion. They have been translated into English by Thomas Davidson (London, 1882) with copious notes, full bibliography, and a well-written *Life*. "Objective idealism, subjective realism, and absolute moralism" is the description Mr. Davidson gives of the Rosminian doctrine. Rosmini's definition of morality as action controlled by absolute truth is the basis of his ethical teaching. His system of philosophy partakes somewhat of Kantianism. In psychology Rosmini was an ontologist: Everything is known in the idea of not actual but possible being, which is inborn; only the determinative details of knowledge are drawn from the senses. At the time of his condemnation by the Congregation of the Index in 1849, Rosmini at once submitted and retired to Stresa, on Lake Maggiore, and there he died. He was a man of exalted personal character. His industry was very great. At the time of his death he had already published thirty octavo volumes on abstruse philosophical and theological subjects and sixty volumes remain in manuscript. Besides the philosophical-theological works of Rosmini there are in English *The Ruling Principle of Method Applied to Education* (Boston, 1887), and *Maxims of Christian Perfection* (London, 1889). Consult: Stökl, *Geschichte der neuern Philosophie* (Mainz, 1883); Werner. *Die italienische Philosophie des 19ten Jahrhunderts* (Vienna, 1884); Lockhart, *Life of Rosmini* (London, 1892); Paoli, *Della vita di Antonio Rosmini-Serbati* (Turin, 1880-84).

ROSNY, rō'nē', Baron de. Minister of Henry IV. of France. See Sully.

ROSNY, Joseph Henry (1856—). A French novelist. He was born in Paris and early became a member of the Naturalistic School. His first novel, published in 1885, after some time spent in London, was *Nell Horn*, a story of the Salvation Army. In it he struck the note he afterwards sounded more strongly, a simple representation of theorists and social reformers, especially those in the middle or lower classes. Possibly his masterpiece is *Le bilatéral* (1886), with its theme of French socialism in the early 80's, and a style of treatment approaching Zola. In 1887, with four others, he attacked the gross realism of Zola's *La Terre* and allied himself with the Goncourts. Beginning in 1891 he collaborated with his brother, Justin. His later titles are: *L'immolation* (1887), a story of life in the country; *La termite*, on literary life in Paris (1890); *Daniel Valgraive* (1891); *L'impérieuse bonté*, dealing with Parisian charity (1894); *L'indompté* (1894), a powerful tale of a girl who studied medicine in Paris; *Le serment* (1896; dramatized 1897); *Les âmes perdues*, on modern anarchism (1899); and *L'héritage* (1902). In these contemporary novels, as well as in the "prehistoric" *Vamireh* (1892), Rosny's characters are real and striking, without being minutely analyzed.

ROSNY, Léon Louis Lucien de (1837—). A French Orientalist. He was born at Loos, studied in Paris at L'Ecole des Langues Orientales, was appointed professor of Japanese at the Bibliothèque Imperiale, and in 1863 interpreter to the Japanese ambassadors at Paris, whom he accompanied to Holland, England, and Russia. He was appointed to the newly created chair of Japanese in his alma mater in 1868, in 1884 was decorated with the Legion of Honor, and in 1886 was nominated assistant in L'Ecole des Hautes Etudes. Among his numerous pamphlets, text books, and original works, some of the more important are: *Introduction à l'étude de la langue japonaise* (1856); *Les écritures figuratives et hiéroglyphiques des différents peuples anciens et modernes* (1860); *Etudes asiatiques de géographie et d'histoire* (1864); *De l'origine du langage* (1869); *Extraits des historiens du Japon* (1874-75); *Les peuples orientaux connus des anciens Chinois* (1882); *Vocabulaire de l'écriture hiératique yucatèque* (1883); *Le livre sacré et canonique de l'antiquité japonaise* (1885); *Le pays de dix mille lacs, voyage en Finlande* (1886); *Taureaux et mantilles: Souvenirs d'un voyage en Espagne et en Portugal* (1889); *Le Taoïsme* (1892).

ROSOLIC ACID (from *rose*), $C_{20}H_{16}O_3$. A red crystalline substance, melting above 270° C. It is insoluble in water, but dissolves in alkalies and in alcohol. Its alkaline solutions are colored red, while its alcoholic solutions have an orange-yellow color. It may be obtained by heating a mixture of carbolic acid and cresol with sulphuric acid and arsenic. Owing to the difficulty of fixing it, it is not much used as a dye. Chemically, rosolic acid is closely allied to aurin (q.v.), and its constitution is represented by the following formula:

$$OH.C_6H_3.C\begin{cases} C_6H_4OH \\ C_6H_4 = O \end{cases}$$

ROSPIGLIOSI, rō'spē-lyō'zē, Palazzo. A palace in Rome, built by the Cardinal Scipione Borghese in 1603 on the ruins of the Baths of Constantine, and afterwards the residence of the Rospigliosi family. It contains a number of art treasures, and is specially celebrated for Guido Reni's ceiling-painting "Aurora" (q.v.).

ROSS, Alexander (1699-1784). A Scottish poet. He was educated at Marischal College, Aberdeen; acted as tutor and school teacher in several places, and in 1732 settled as schoolmaster at Lochlee, in Angus, where he remained until his death. He was all his life a writer of verses, but his only publication was *The Fortunate Shepherdess, a Pastoral Tale in the Scottish Dialect* (1768), which has a humorous preface by Dr. James Beattie, and contains several songs still popular in Scotland. Consult the edition under the title *Helenore*, by J. Longmuir (1866).

ROSS, Alexander (1742-1827). A British general, born in Scotland. He entered the army as ensign in 1760; served in Germany in the Seven Years' War, and attained the rank of captain in 1775 and that of major in 1780. He served through the American war as aid-de-camp of Lord Cornwallis and was the commissioner appointed by Cornwallis to arrange his surrender at Yorktown in 1781. In 1783 he became deputy adjutant-general in Scotland, served throughout the campaign of Cornwallis against Tipu Sahib in India, fighting in every battle, was promoted

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colonel in 1793 and appointed governor of Fort George, and became general in 1812.

ROSS, ALEXANDER (1783-1856). A Canadian author and pioneer. He was born in Nainshire, Scotland; emigrated to Canada in 1805, taught school for a time in Glengarry, Upper Canada, and in 1810 went with John Jacob Astor's expedition to Oregon. About 1825, after many years' service with the Hudson's Bay Company, he settled in the Red River country, and held some offices there. He wrote *Adventures of the First Settlers on the Oregon or Columbia River* (1849), *The Fur Hunters of the Far West* (1855), and *The Red River Settlement, Its Rise, Progress, and Present State* (1856).

ROSS, ALEXANDER MILTON (1832-97). A Canadian naturalist, born in Belleville, Ontario, December 13, 1832. He studied medicine in New York and took his degree in 1855. During the Civil War he served as a surgeon in the Federal army, and at its close served in Mexico under Juarez. He then returned to Canada and devoted himself to the study of natural history. He published: *Recollections of An Abolitionist* (1867); *Birds of Canada* (1872); *Butterflies and Moths of Canada* (1873); *Flora of Canada* (1873); *Forest Trees of Canada* (1874); *Mammals, Reptiles, and Freshwater Fishes of Canada* (1878); *Vaccination a Medical Delusion* (1885); *Medical Practices of the Future* (1887).

ROSS, EDWARD ALSWORTH (1866—). An American economist and sociologist, born in Virden, Ill. He graduated at Coe College, Cedar Rapids, in 1886, and took graduate courses at Berlin and in Johns Hopkins University. He was appointed professor of economics at Indiana University in 1891, associate professor of political economy at Cornell in 1892, and from 1893 to 1900 was professor at Leland Stanford University, first of economics and then of sociology. His resignation from this post under pressure in 1900 aroused some excited discussion of the right of academic free speech. Afterwards he was appointed professor of sociology in the University of Nebraska. His publications include: *Sinking Funds* (1892); *Honest Dollars*, a free-silver pamphlet (1896); and *Social Control, a Survey of the Foundation of Order* (1901).

ROSS, EDWARD DENISON (1871—). An English Orientalist. He studied at University College, London, specialized in Oriental languages at the University of Paris and Strassburg, traveled in the East, and after five years in the chair of Persian at University College, in 1901 became principal of the Calcutta Madrasa. He published: *A History of the Moghuls of Central Asia*—a translation of the *Tarikh-i-Rashidi* of Mirza Haidar (1898); *The Heart of Asia* (with Skrine, 1899); and a biographical sketch of Omar Khayyam prefixed to an edition of FitzGerald's version (1900).

ROSS, GEORGE (1730-79). A signer of the Declaration of Independence. He was born in New Castle, Del., studied law with an elder brother in Philadelphia, and established himself at Lancaster, Pa. In 1768 he was elected to the Pennsylvania Legislature, and was repeatedly reëlected. He espoused the cause of the Indians and strove to protect them against unscrupulous whites. He was one of the seven delegates from Pennsylvania to the Continental Congress of 1774, continued a member of that body until January, 1777, and signed the Declaration of Independence. During the same period he continued to sit in the Pennsylvania Legislature, and in that capacity did much toward putting the State into a condition of defense. In April, 1779, he was commissioned Judge of the Pennsylvania Court of Admiralty, but died not long after taking office. Consult Dwight, *Lives of the Signers* (New York, 1876).

ROSS, GEORGE WILLIAM (1841—). A Canadian educator and statesman, born near Nair, Ont., and educated in the Toronto Normal School and in the Law School of Albert University. He was called to the bar in 1887, and at that time had long been prominent in educational affairs, and from 1872 to 1883 had been a Liberal member of the Dominion Commons, where he urged reciprocity with the United States. In 1883 he became Minister of Education for Ontario, and in 1899 was named Premier and Treasurer of the Province. He became well known as an orator and lecturer, and an agitator for temperance reform and prohibition. He wrote *Life and Times of Alexander Mackenzie*, with William Buckingham (1892), and *The Universities of Canada, Their History and Origin* (1896).

ROSS, Sir JAMES CLARK (1800-62). An English navigator and Arctic and Antarctic explorer, born in London. He entered the navy under his uncle, Sir John Ross, in 1812, accompanied him on his first expedition to discover the Northwest Passage in 1818, and participated in the voyages of Captain Parry in 1819 to 1825, and also in 1827, when Parry made the highest point north reached up to that time. He then served on the four years' expedition of his uncle in his second attempt to find the Northwest Passage. On this expedition the younger Ross made himself famous by his brilliant sledge journeys. He discovered King William Land and determined the position of the north magnetic pole off the west coast of Boothia Felix (1831). In 1834 he was made a post-captain. In 1839 he was put in command of the expedition suggested by the Royal Society and the Royal Geographical Society for the discovery of the southern magnetic pole. In 1840 his two vessels, the *Erebus* and the *Terror*, pushed through the ice pack southward of New Zealand, sailing along the 170th meridian, east longitude, and on January 11, 1841, he discovered in latitude 71° 15′ S. a new land, rising in high peaks. Ross pushed in a southerly direction along the coast, landing at two islands named by him Possession Island and Franklin Island, and on January 28th came upon an active volcano more than 12,000 feet high, which he named Mount Erebus, and an extinct volcano more than 10,000 feet high, which he named Mount Terror. He then sailed to the eastward along a barrier of ice some 300 feet high, and returned to Tasmania. He named the new territory Victoria Land. It is the largest land mass yet found in the southern polar regions, and has been revisited by several other expeditions. (See POLAR RESEARCH.) In the succeeding year he revisited this land and reached a latitude of 78° 10′ S., which remained the lowest southern record until 1900. In the course of his first voyage he had found open water at a spot where Lieutenant Wilkes of the United States Navy, who had

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preceded him in the Antarctic regions, relying upon the report of a merchant captain, had indicated land. Ross, therefore, asserted that all other reports of Wilkes concerning land discovered in the Antarctic regions were untrustworthy, and thus arose a controversy among geographers. For some years Wilkes's Land did not appear on British charts. (See WILKES, CHARLES.) Ross indicated a location of the southern magnetic pole in Victoria Land, and though his observations have proved not altogether accurate, his expedition was the best conducted and perhaps the most important of any of the early Antarctic voyages. He arrived in England in 1844 and was knighted. In 1848 he commanded an expedition to Baffin Bay in a vain quest for Sir John Franklin. He was made rear-admiral in 1856. He died at Aylesbury. He described his Antarctic discoveries in *A Narrative of a Voyage in Antarctic Regions* (1847).

ROSS, Sir JOHN (1777-1856). A British Arctic explorer and naval officer, born at Inch, Wigtonshire, Scotland. He entered the navy in 1786, and he took part in the wars with France. In 1818 he was sent to the Arctic regions west of Greenland to attempt the discovery of the supposed Northwest Passage. His vessel was the *Isabella*, and he was accompanied by Parry, in charge of the *Alexander*. He sailed along the west coast of Greenland to latitude 76° 54′ N. beyond the Carey Islands, met the Cape York natives and gave them the name of Arctic Highlanders, which has ever since been applied to them. Turning south along the west side of Baffin Bay, he penetrated Lancaster Sound, which he explored for 50 miles. He erroneously concluded that it was nothing more than a deep bay and turned back, thus losing his opportunity to discover the beginnings of the Northwest Passage. In England his voyage was regarded as a failure, and it was not till 1829 that Ross, who was recognized as an able and courageous sailor, was intrusted with the command of another expedition.

He started on another quest for the Northwest Passage in command of the small paddle-wheel steamer *Victory*, the first steam vessel used in Arctic exploration. The steam power proved a failure and the useless engine was thrown away. Ross crossed Bellot Strait, thinking it was only a bay. He discovered and named Boothia Felix, the most northerly extension of the American mainland, and other very important discoveries were made, largely by sledging parties in which James C. Ross, the nephew of the commander, bore a brilliant part. In 1831 the position of the north magnetic pole was determined. Three winters were spent in the ice of this region, until failure of food supplies compelled Ross to abandon his vessel, still frozen in the pack, and make a desperate march north to Fury Beach, where caches of food supplies saved the lives of the party. They were compelled to spend the winter here in a house which they had erected, and in the following summer (1833) fell in with a whaler on which they reached home. Only three men had been lost during this long and remarkable journey. Ross was knighted, made C. B., and honored by many learned societies. In 1850 he participated in the search for Sir John Franklin, in command of the small vessel *Felix*, but returned home after a year of fruitless endeavor. He was made rear-admiral and died in London in 1856. His published works are: *A Narrative of a Second Voyage, Including the Reports of Commander James C. Ross and the Discovery of the Northern Magnetic Pole* (London, 1835); also a treatise on steam navigation and many papers.

ROSS, JOHN (1790-1866). A chief of the Cherokee Nation and a determined champion of his people in the struggle which culminated in their removal to the West. He was born October 3, 1790, at Rossville, Georgia, not far from Chattanooga. He was of mixed blood, his father, Daniel Ross, having emigrated from Scotland before the Revolution and married a quarter-blood Cherokee woman, the daughter of John McDonald, also from Scotland. He was educated at Kingston, Tennessee, and began his public career in 1809. In the Creek War of 1813-14 he served as Adjutant of the Cherokee Regiment, which coöperated with General Jackson, and took part in the battle of Horseshoe Bend. In 1817 he was elected to the National Committee of the Cherokee Council, his first duty in that capacity being to prepare a reply to the United States commissioners, declining to negotiate for the sale of the Cherokee lands. In 1819, as president of the national committee, he was active in introducing schools, blacksmiths, and mechanics into the nation. In 1827 he presided over the convention which formulated a regular constitution for the government of the Cherokee Nation, and was elected assistant chief. In the next year, 1828, he was made principal chief and held the position until his death in 1866, which occurred at Washington. During this long period his history is the history of the Cherokee Nation.

ROSS, LUDWIG (1806-59). A German archæologist, born at Altekoppel, Holstein. In 1832 he went to Greece, where he was appointed, by the Greek Government, superintendent of the antiquities of the Peloponnesus (1833), and in 1837-43 was professor of archæology at the University of Athens. While in the latter post he explored the greater part of Greece, collected valuable documents, and fixed the topography of various classical localities. In 1845 he became professor of archæology at Halle. His works include: *Reisen auf den griechischen Inseln des Aegäischen Meers* (1840-52); *Inscriptiones Græcæ Ineditæ* (1836); *Die Demen von Attika nach Inschriften* (1846); *Das Theseion und der Tempel des Ares zu Athen* (1852); *Archäologische Aufsätze* (1855-61); and *Italiker und Gräken* (1858), where, in opposition to the discoveries of modern philologists, he maintained the Greek origin of the ancient inhabitants of Italy. Consult Otto Jahn, *Biographische Aufsätze* (Berlin, 1867).

ROSS, ROBERT (c.1766-1814). A British soldier. He was born at Ross Trevor, Devonshire, and after graduating at Trinity College, Dublin, entered the British army and served in Holland and Egypt. At the beginning of the War of 1812 he was selected by the Duke of Wellington to command a brigade in America. After defeating the American troops at Bladensburg, he proceeded to Washington, where he set fire to the public buildings (August, 1814). This proceeding the English justified on the ground that Amer-

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icans had burned the Canadian Government buildings at York (Toronto). General Ross was killed at North Point, Md., while marching to Baltimore on September 12, 1814.

ROSS, Sir WILLIAM CHARLES (1794-1860). An English miniature painter, born in London. After receiving instruction from his mother, Maria Ross, portrait painter, in 1808 he entered the schools of the Royal Academy. In 1814 he was made assistant to Andrew Robertson, a miniature painter. Although at first ambitious to surpass in historical compositions, in time he devoted himself entirely to miniatures, securing a lucrative practice among the fashionable circles and royalties of Europe. In 1843 he was made Royal Academician, and on June 1, 1842, was knighted by Victoria. Ross executed over 2000 miniatures on ivory. His portraits are refined, graceful, and distinctively characteristic of the individual; the color is pure and rich.

ROSS, THE MAN OF. See KYRLE, JOHN.

ROSS AND CROM'ARTY. A northern county of Scotland. The mainland portion is bounded on the north by Sutherland, east by the North Sea, south by Inverness, and west by the Atlantic (Map: Scotland, C 2). The greater part of the island of Lewis, with Harris, belongs to this county. Area, 3078 square miles. Ross and Cromarty in many parts presents a wild and mountainous aspect. The high grounds afford excellent pasture for sheep and cattle and the glens, in the more favored portions, are generally fertile, producing grain of a superior quality. The fisheries are important. The principal loch is Maree (Insignificant). Chief towns, Cromarty, Dingwall (the county town), Tain, and Stornoway. Population, in 1801, 56,300; in 1851, 82,700; in 1901, 76,400.

ROSSANO, rôs-sä'nô. A city in the Province of Cosenza, Italy, situated on a foot-hill of the Apennines, near the Gulf of Taranto, 28 miles northeast of Cosenza (Map: Italy, L 8). It is walled, well built, and defended by a castle. The city has a beautiful cathedral, and an archiepiscopal library with a valuable manuscript of the Gospels. Alabaster and marble are quarried, and there are manufactures of silk and olive oil. Population (commune), in 1881, 17,979; in 1901, 13,555.

ROSSBACH, rôs'bäg. A village in Prussian Saxony, 9 miles southwest of Merseburg. It is celebrated for the victory gained here by the Prussians under Frederick the Great over the combined French and Imperialist armies under the Prince de Soubise and the Prince of Saxe-Hildburghausen on November 5, 1757. The Prussians numbered some 22,000 men, while the forces of the allies are variously estimated at from 43,000 to 63,000. It was the intention of the allies to turn Frederick's left flank, while creating a diversion by an attack in front. Frederick, perceiving the manœuvre, shifted his left wing, consisting mainly of the cavalry under Seydlitz, so as to meet the enemy's threatened attack. The allies were thrown into utter disorder after less than a half hour's fighting, and put to flight. The Prussians lost some 500 men in killed and wounded, while the loss of the allies was more than 700 dead, 2000 wounded, and 5000 prisoners. The victory of Rossbach was important for the moral strength it brought to the Prussian cause at a time when its fortunes were at the lowest. Consult Von der Goltz, *Rossbach und Jena* (Berlin, 1883).

ROSSBACH, AUGUST (1823-98). A German archæologist, born in Schmalkalden, and educated at Leipzig and Marburg. He was appointed docent in 1852, and professor in 1854 at Tübingen, and in 1856 went to Breslau as professor of philology and archæology. He edited Catullus (1854; 2d ed. 1860) and Tibullus (1854), and wrote on Roman marriage, *Römische Hochzeits- und Ehedenkmäler* (1871); but it is with Greek metrics that his name is most closely connected because of coöperation with Westphal on *Metrik der griechischen Dramatiker und Lyriker* (1854-65; 3d ed., as *Theorie der musischen Künste der Hellenen*, 1885-89). His son, OTTO (1858—), also an archæologist, was born in Breslau; studied there, at Jena, at Rostock, and at Berlin, where in 1884 he became assistant in the anthropological museum; was professor at Kiel from 1890 to 1895, and then was appointed to a chair of archæology in the University of Königsberg and to the post of instructor in the Academy of Art. He wrote: *De Senecæ Philosophi Resensione* (1886); *Griechische Antiken des archäologischen Museums in Breslau* (1889); an edition of Florus (1896), and many contributions on mythology, art, and literature to the Pauly-Wissowa *Realencyklopädie*. In 1900 he published a memoir of his father.

ROSSE, WILLIAM PARSONS, third Earl of (1800-67). An English astronomer, born in York. He was educated first at Trinity College, Dublin, and afterwards at Magdalen College, Oxford, where he graduated first-class in mathematics in 1822. At an early age Rosse devoted much attention to the study of practical science, and especially to the problem of the best mode of constructing the speculum of the reflecting telescope. The two great defects which had baffled opticians were 'spherical aberration' and absorption of light by specula; and in the casting of these of large size there was the apparent impossibility of preventing cracking and warping of the surface on cooling. By a long series of carefully conducted experiments, Rosse succeeded in discovering a mode of operation by which the last defect was wholly obviated, and the two others greatly diminished. The metal for the speculum of his great telescope (see TELESCOPE), three tons weight, was poured into the iron mold in April, 1842, and the mold was kept in an annealing oven for 16 weeks, so that the metal should cool equably. It was then polished and mounted in his park at Parsonstown, at a cost of £30,000. The first addition to astronomical knowledge made by this telescope was the resolution of certain nebulæ, which had defied Herschel's instrument, into groups of stars; next came the discovery of numerous binary and triple stars. The telescope itself is now dismounted; and experience has shown that metal reflectors cannot be made permanently useful, on account of the rapid tarnishing of the polished surfaces.

ROSSELLI, rô-zĕl'lê, COSIMO DI LORENZO FILIPPI (1439-1507). A Florentine painter of the Renaissance. He was the pupil and assistant of Neri di Bicci (1453-56) and perhaps of Benozzo Gozzoli. At all events, he shows unmistakable traces of the latter's influence, as well as that of

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Baldovinetti. Among his own pupils were Fra Barto Commeo and Piero di Cosimo. In 1480 he was called to Rome by Pope Sixtus IV. to assist in decorating the Sistine Chapel (with Bigordi, Perugino, and Signorelli). The best of the frescoes which he then executed is "The Sermon on the Mount." He painted there also "The Tables of the Law," "The Destruction of Pharaoh," "Christ Preaching from the Lake," and "The Last Supper" (1482). Among his more numerous works in Florence are "The Coronation of the Virgin" (Sta. Maria Maddalena dei Pazzi) and "The Miraculous Chalice" (Sant' Ambrogio). The latter contains among other portraits that of Pico della Mirandola. Besides others in Florence there are also examples of his art in many German galleries, and in London, Naples, Oxford, Paris, and Saint Petersburg.

ROSSELLINI, rō'zĕl-lē'nē, THE. A surname applied to two early Renaissance sculptors and architects of Florence, ANTONIO and BERNARDO DI MATTEO DI DOMENICO GAMBARELLI (1427-c.1478 and 1409-64). They were the youngest and eldest respectively of five brothers Gambarelli, stone-cutters of Settignano, who established themselves at Florence in 1439. The appellation Rossellino properly belonged to Antonio, but was afterwards extended to his more famous elder brother. Bernardo was the pupil of Alberti and possibly of Donatello. His tomb of Leonardo Bruni (Aretino) in Santa Croce (1444) is one of his best works in sculpture and the prototype of the fifteenth-century Florentine tombs. The tombs of Beata Villana (1451) in Santa Maria Novella and of Filippo Lazzari in San Domenico of Pistoia (with his brother) are also noteworthy pieces of sculpture. It was in architecture, however, that Bernardo made his fame. Under the popes Nicholas V. and Pius II. he was employed in many of the chief works of the day. He planned extensive changes in the Vatican and made designs for Saint Peter's which were afterwards used and changed by Bramante. The Rucellai Palace in Florence (1450), the Piccolomini palaces at Siena (finished 1498) and Pienza (1462), were also his work, as well as the cathedral, the bishop's palace, and the city hall of the last named town (1460-63), the fortifications of Civitá Vecchia, Narni, Orvieto, Spoleto, and restorations of numerous churches in Rome and elsewhere.—ANTONIO was the pupil of his brother Bernardo and perhaps of Desiderio da Settignano. His work was almost exclusively in sculpture, although the Chapel of San Miniato, which contains his masterpiece, the tomb of Cardinal Jacopo di Portogallo (1461), is said to have been built by him. Other noteworthy tombs are those of the Duchess of Arno (Monte Oliveto, Naples), and of Roverella (with Barocci, San Giorgio, Ferrara, 1475). His also is the rich fountain of the Villa di Castello on the hills above Florence, near San Miniato; a figure of Saint Sebastian (1457), at Empoli, which has been called one of the most beautiful of its century; the sarcophagus of Saint Marcolinus at Forlì; and other works at Florence, Naples, and Pistoia. Consult: Geymüller-Stegmann, *Die Architektur der Renaissance in Toscana* (Florence, 1885-96); Müntz, *Les arts à la cour des papes pendant le XV. et le XVI. siècle* (Paris, 1878-98); and Vasari, *Lives*, etc., ed. Blashfield-Hopkins (New York, 1896).

ROS'SER, THOMAS LAFAYETTE (1836—). An American soldier and civil engineer, born in Campbell County, Va., and reared in Texas. He entered the United States Military Academy in 1856 and resigned in 1861, before graduating, to enter the artillery of the Confederate Army. After a year's service in this branch, he was transferred to Stuart's cavalry; and in the same year he was promoted to be brigadier-general in command of the 'Laurel Brigade.' Rosser became major-general in 1864, and in 1865 refused to surrender with Lee, but made his escape and attempted to reorganize the Confederate forces in northern Virginia. He was captured soon after, and after his release studied law. In 1871 he was appointed chief engineer of the Eastern Division of the Northern Pacific. As chief engineer of the Canadian Pacific (1881 et seq.) he built most of the line west of Winnipeg; and in 1886 retired to Virginia. During the war with Spain Rosser served as brigadier-general of United States Volunteers.

ROSSET'TI, CHRISTINA GEORGINA (1830-94). An English poet, younger daughter of Gabriele Rossetti, and sister of Dante Gabriel Rossetti. She was born in London, and was educated at home under the care of her mother. After a life of devotion and retirement, she died December 29, 1894. The poetic impulse manifested itself early. She addressed a poem to her mother on the latter's birthday, April 27, 1842; sent two poems to the *Athenæum* in 1848, and contributed several beautiful lyrics to *The Germ* (1850). Her published volumes of poems comprise mainly *Verses* (privately printed, 1847); *Goblin Market, and Other Poems* (1862); *The Prince's Progress, and Other Poems* (1866); *A Pageant, and Other Poems* (1881); *Poems*, new and enlarged edition (1891); *Verses* (1893); *New Poems* (posthumous, 1896). Of much interest, too, is *Maude: Prose and Verse* (1850; reprint, 1897). She also wrote many devotional pieces in prose, which circulated widely. As a poet Christina Rossetti ranks high; her only equal among the English women of the nineteenth century was Mrs. Browning. She is seen at her very best in her short and intense lyrics like "After Death" and "Passing and Glassing." Consult her *Poems* (Boston, 1899), and Mackenzie Bell, *Christina Rossetti, a Biographical and Critical Study* (London, 1898). Her sister, MARIA FRANCESCA (1827-76), was also a remarkable woman. She is known for her admirable *A Shadow of Dante* (1871).

ROSSETTI, DANTE GABRIEL (1828-82). A famous English poet and painter, the head of the Pre-Raphaelite Brotherhood. (See PRE-RAPHAELITES.) He was born in London, May 12, 1828, the eldest son of Gabriele Rossetti (q.v.). The literary and artistic environment in which he was brought up was stimulating to the boy's precocious powers, and at the age of six he had begun to compose dramatic scenes. After spending five years at King's College School and studying in Cary's art academy and in the Royal Academy, at twenty he became a pupil of Ford Madox Brown, whose influence had much to do with his development. With Holman Hunt, Millais, and others, Rossetti worked toward the revival of the detailed elaboration and mystical interpretation that characterized Pre-Raphaelite art. In 1860 he married Elizabeth Eleanor Siddal, whose peculiar type of beauty he has immortalized in

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many of his best known pictures. She died two years later, and Rossetti never recovered from the shock. In addition to this grief he was much troubled by a bitter attack made (in 1871) upon the morality of his poems, in an article entitled "The Fleshly School of Poetry." This was written by Robert Buchanan, whose identity, veiled under the pseudonym of 'Thomas Maitland,' was not revealed until some time afterwards. The charge was vigorously rebutted by Swinburne, and by Rossetti himself under the title "The Stealthy School of Criticism." His mental depression brought on, by 1868, chronic insomnia, for which he sought to find relief in chloral. The drug obtained an unhappy mastery over him, which threw a tragical gloom upon his later years, relieved only by the creative play of his mind, which continued almost to the last to produce pictures and poems of singular beauty. He died at Birchington, April 10, 1882.

It is hard to say whether Rossetti deserves a more lasting place in the history of poetry or in that of painting. At twenty he wrote a remarkable poem, which, perhaps better than any other, illustrates the Pre-Raphaelite movement on its literary side—"The Blessed Damosel"; the combination of simplicity and concreteness with lofty spirituality, which makes it typical of the aims of the school both in literature and art, appears also in another of his early poems, "My Sister's Sleep." The great bulk of his poetry was not published until 1870. In despair at the death of his wife he placed in her coffin all his unpublished writings, and there they remained buried until at the urgent request of his friends he consented to have them exhumed. This volume, another of *Ballads and Sonnets* (1881), and a series of translations from early Italian poets, *Dante and His Circle* (1874), contain the whole of his poetical accomplishment. His only imaginative work in prose was the delicate and spiritual story, *Hand and Soul* (1850). He made several attempts in ballad form, two of which, "Sister Helen" and "The King's Tragedy," are especially remarkable; the latter illustrates his dramatic power at its highest. A special place must be accorded to his great sonnet-sequence, "The House of Life," which in its final form contains a hundred and one magnificent sonnets inspired chiefly by the love and the loss of his wife. In them the language and imagery grew much more elaborate than in his earlier work. His poetry as a whole has been called 'painter's poetry,' from its constant appeal to the eye, making it "a kind of poetical tapestry, stiff with emblazoned images." Picturesqueness and visual beauty are its most salient characteristics.

His paintings fall readily into three periods. There are, first, the small biblical pictures of which "Ecce Ancilla Domini" and the "Girlhood of Mary Virgin" are best known. Second, the Dante pictures, in which there is a brilliant imaginative Romanticism, the most important being "Giotto Painting the Portrait of Dante." "The Salutation of Beatrice on Earth and in Eden," "La Pia," "Beata Beatrix" (National Gallery, London), and "Dante's Dream" (Walker Art Gallery, Liverpool). "La Donna della Finestra" (1879) is counted among his ripest creations, but "Dante's Dream" perhaps shows the painter at his zenith. Rossetti's wife sat for many of this series. The third period was occupied almost exclusively with the 'painting of the soul,' when he painted feminine figures furnished with poetic attributes, the deeper meanings of which he interpreted in his poems. Among these pictures the "Sphinx" alone contains several figures. "The Blessed Damosel," "Fiammetta," "The Day Dream," "Astarte Syriaca," "Monna Pomona," and others are separate figures dedicated to the memory of his wife. Rossetti's tall Gothic figures are motionless and silent, and are eloquent only through their spiritual hands and dreamy eyes. He drapes his figures in Venetian fashion and strews flowers about them, especially roses and hyacinths. A realistic picture, "Found," an illustration of the tragedy of seduction, occupies the place among his pictures which "Jenny" holds among his poems. Rossetti as a painter was not particular about details and was often awkward in line, but in color he was clearly the best of the Pre-Raphaelite group. He revels in glowing, sensuous lines, and had much decorative feeling. He painted as he wrote, in a mystical, romantic spirit. Many of his pictures are scattered in English country houses, and in private collections in Florence and in America.

His collected works were published by his brother, William Michael, in 1886, and his family letters (with a memoir) in 1895; also *Pre-Raphaelite Diaries and Letters* (1900). Consult also: biographies by William Sharp (London, 1882); Knight (ib., 1887); Hall Caine, *Recollections of Dante Gabriel Rossetti* (ib., 1882); Tirebuck, *Rossetti, His Work and Influence* (ib., 1882); Wood, *Rossetti and the Pre-Raphaelite Movement* (New York, 1894); Cary, *The Rossettis* (ib., 1900); Marillier, *Rossetti* (London, 1901); essays by Sarrazin, in *Poètes modernes de l'Angleterre* (Paris, 1885); Swinburne, in *Essays and Studies* (London, 1875); and Pater, in Ward's "English Poets" (ib., 1883).

ROSSETTI, Gabriele (1783-1854). An Italian author, born at Vasto. He at first dedicated himself to painting, but renounced this career to devote himself to letters. In 1814 Murat made him Secretary of Instruction and the Fine Arts. As a member of the secret society of the Carbonari, Rossetti had a hand in the Napoleonic Revolution of 1820, and in his beautiful ode *Sei pur bella* he appeared as the poet of this movement. When King Ferdinand returned to power, he had to take refuge aboard an English vessel. After a couple of years in Malta, he went to London in 1824, where in 1831 he was appointed to a post in King's College. He was a most enthusiastic student of the work of Dante and sought to develop a fantastically absurd theory according to which Dante and the other great writers of his time wrote in a sort of conventional jargon for the purpose of diffusing Masonic doctrines. This is the idea that actuates Rossetti's *Commenta analitico sulla Divina Commedia* (London, 1826), and other treatises. Rossetti continued to produce verse of facile invention and intensely patriotic in expression; his *Iddio e l'uomo salterio* appeared in 1840, his *Veggente in solitudine* in 1846, and his *Arpa evangelica* in 1852. He became blind in 1845. Three of his children have been prominent in English art and letters of the nineteenth century—Dante Gabriel, Christina Georgina, and William Michael Rossetti. Consult: Carducci's ed. (with a preface) of the *Poesie di Gabriele Rossetti*

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(Florence, 1861); the biography by Pietrocola in the *Contemporanei italiani* (Turin, 1861).

ROSSETTI, WILLIAM MICHAEL (1829—). An English critic of art and literature, brother of Dante Gabriel Rossetti. He was born in London and from King's College School entered the excise office in 1845, became assistant secretary there in 1869, and was retired in 1894. He was closely connected with the Pre-Raphaelite Brotherhood, beginning in 1848, and was editor of its organ, *The Germ*. He published a version of Dante's *Inferno* (1865) and *Fine Art* (1867), but his popular repute is as an editor of poetry and of material in regard to the Pre-Raphaelites, and as a biographer. His more important works include: *Dante G. Rossetti as Designer and Writer* (1889); *Memoir of Rossetti* (1895); *New Poems of Christina Rossetti* (1896); *Ruskin, Rossetti, Pre-Raphaelitism* (1898); *Memoirs of Gabriele Rossetti*, a translation of his father's autobiography (1901); the *Collected Works of D. G. Rossetti; Life of Keats* (1887); *Lives of Famous Poets* (1878); and editions of English poets and of *Pre-Raphaelite Diaries and Letters* (1900). His wife, a daughter of Ford Madox Brown, an author and painter herself, died in 1894.

ROSSI, rôs'sê, ASARYA (or AZARIAH) DEI (c.1514-78). An Italian Hebraist, born in Mantua. In 1574-75 he published his great work *Mâ'or 'ênayim*, or "The Light of the Eyes," of which the first part deals with the earthquake of Ferrara in 1570 and of natural phenomena in general. The second tells of the translation of the Septuagint, and the third deals with literary and historical criticism, for the most part in a very radical manner. Rossi answered orthodox attacks in *Maxref la Kesef*, or "The Refining Pot for Silver" (reprinted with the *Mâ'or 'ênayim* by Zunz at Vilna, 1863-66).

ROSSI, ERNESTO (1829-96). An Italian actor. He was born at Leghorn, and studied law at the University of Pisa. Subsequently he entered a dramatic school, and after having appeared in various Italian cities, went in 1855 with Mme. Ristori to Paris. He acted there and later in Vienna with great success, and then returned to Italy and founded a dramatic company. He appeared again in Paris in 1866 in *Le Cid* on the occasion of the anniversary of Corneille. Having visited Spain, Portugal, and South America, he returned to Paris in 1875 and gave a series of Shakespearean representations. He also played successfully in London and in the United States (1881) in Shakespearean characters. Consult his *Quarant' anni di vita artistica* (Florence, 1887-89). He was the author also of *Studj drammatici* (1882) and of a few plays. His brother, CESARE ROSSI (1828-98), was a noted comedian.

ROSSI, FRANCESCO DEI (1510-63). An Italian painter, known also as Il Cecchino del Salviati and Salviati, from his patron, Cardinal Salviati. He was born in Florence, and was a pupil of Bugiardini, Bandinelli, and Andrea del Sarto (1529). Under the protection of Cardinal Salviati, he went early to Rome and painted in Santa Maria della Pace, and in the palace of his patron. In 1554 he was taken to France by Cardinal de Lorraine, and there was occupied in the Cardinal's Château de Dampierre and at Fontainebleau. His frescoes and easel pictures, full of mannerisms imitated from Michelangelo, are in various European galleries.

ROSSI, GIOVANNI BATTISTA DE (1822-94). An Italian archæologist, best known for his contributions to the knowledge of Christian antiquities. He was born in Rome, studied in the Collegio Romano and at the Sapienza, and then received the post of *scriptor* in the Vatican Archives, where he was long engaged in cataloguing manuscripts. The work for which he is most famous is the study of the Catacombs. Not only did he map their windings, but he made the important discovery of the Cemetery of Saint Calixtus, with its Papal tombs from the third Christian century. Rossi saw the great importance of literature in connection with epigraphy, and for the history of the Catacombs utilized martyrologies, calendars, and mediæval itineraries. In this, his great work, he was largely assisted by his brother, Michele de Rossi. Supplementing the *Roma sotteranea cristiana* (1864-77) were the *Musaici cristiani e saggi di pavimenti delle chiese di Roma* (1872-96), and the *Inscriptiones Christianæ Urbis Romæ Septimo Sæculo Antiquiores* (1857-88). Apart from Christian archæology, which was the main topic of the *Bolletino di archeologia* (1863-94, edited and almost entirely written by him), he was an able epigraphist. The Berlin Academy appointed Rossi, Mommsen, and Henzen a commission for the publication of the *Corpus Inscriptionum Latinarum* (1863 et seq.). With Henzen he edited the sixth volume of the *Corpus*, the non-Christian *Inscriptiones Urbis Romæ Latinæ* (1876-94.)

ROSSI, PELLEGRINO, Count (1787-1848). An Italian jurist and statesman, born in Carrara. He studied at Pisa and Bologna, and became professor of law at the latter university in 1812. In 1815 he sided with Murat, and upon his fall took refuge at Geneva, where he was appointed professor of criminal law (1819) and published *Le droit pénal* (1829), a very learned work, which made him famous in France. In 1833 Louis Philippe called him to Paris, and appointed him professor of political economy in the Collège de France. He there wrote his treatise *Du droit constitutionnel*, in recognition of which he was made a member of the Chamber of Peers (1839). Rossi was sent to Rome as ambassador in 1845. There he became once more an Italian subject after the fall of Louis Philippe (1848), being elected from Bologna to the Roman Chamber. On September 14, 1848, he was intrusted by Pius IX. with the formation of a Ministry. He opposed the House of Savoy and planned an alliance with the King of Naples, which had for its object an Italian confederation under the Papal presidency. The resulting unpopularity of Rossi probably led to his assassination, November 15, 1848. Besides the *Droit pénal*, Rossi published the *Cours d'économie politique* (1840) and other works. He also left many unedited writings. Consult D'Ideville, *Le comte Pellegrino Rossi: sa vie, son œuvre, sa mort, 1787-1848* (Paris, 1887).

ROSSINI, rô-sê'nê, GIOACHINO ANTONIO (1792-1868). A famous Italian composer, born at Pesaro. At the age of fifteen he was sent by the Countess Perticari to the Lyceum of Bologna. His first opera was composed in 1810 under the title of *La Cambiale di Matrimonio*, and met

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with moderate success. Within the next two years he had written eight operas, all of them poor and short-lived. *Tancredi*, his first important work, was performed in 1813 at Venice, and placed its composer at once in the front rank. Next came *L'Italiana in Algeri* (1813), *Il Turco in Italia* (1814), and *Aureliano in Palmira* (1814), each of them inferior to *Tancredi*. In 1815 he was appointed musical director of the Theatre of San Carlo at Naples. *Il barbiere di Seviglia*, one of the most successful comic operas ever written, is said to have been composed in 20 days, and was first produced in 1816 at Rome. *Otello* followed in 1817, as also did *La Cenerentola* at Rome, and, *La Gazza ladra* at Naples. Before the close of his engagement at Naples (1823) he wrote *Mosè in Egitto*, *La donna del lago*, *Maometto secondo*, and *Zelmira*. In 1823 *Semiramide* was performed in Venice, after which Rossini went to Paris, and was given the directorship of the Italian opera, one of the most coveted prizes in the musical world; but his constitutional indolence unfitted him for this position. In 1829 *Guillaume Tell* was produced, an opera considered one of his best works. In 1836 he returned to Italy, where, with the exception of a visit to Paris, he principally resided till 1855. With *Guillaume Tell*, Rossini's operatic career may be said to have closed, although his fame revived some time after, owing to his well-known *Stabat Mater*, a popular sacred work, almost secular in its musical style. Rossini was undoubtedly the greatest lyrical composer of that school of Italian opera which has found its most radical antithesis in the art of Wagner. His music is marked by stirring melody, brilliant effects, and spontaneous vivacity, and at one time had considerable vogue, although to-day only four of his forty operas are ever heard. For his biography, consult Beyle (Paris, 1892), Pougin (ib., 1870), Zanolini (Bologna, 1875), and Stittard (Leipzig, 1882).

ROS'SITER, THOMAS PRICHARD (1817-71). An American portrait and historical painter, born in New Haven, Conn. He was a pupil of Nathaniel Jocelyn; in 1838-40 he painted portraits in London and Paris, and in 1841-46 he lived in Rome. Upon his return to New York City he became known as an historical painter, and in 1849 was elected a National Academician. He had a studio in Paris from 1853 to 1856, winning a gold medal at the Universal Exposition of 1855 for his "Venice in the Fifteenth Century" (1854). Among his works are: "Jews in Captivity;" "The Wise and Foolish Virgins;" "The Home of Washington" (1858), painted together with Mignot; "Washington's First Cabinet;" and a series of pictures illustrating the "Life of Christ." He was a conscientious painter, but his pictures lacked spirit and animation.

ROSS'LAND. A city in the Yale and Cariboo District of British Columbia, Canada, 6 miles from the international boundary line, on railways connecting with the Canadian Pacific and with lines of the United States (Map: British Columbia, F 5). It has developed rapidly, owing to the rich mineral deposits of the vicinity. Gold is mined extensively, and silver and copper also are found. A large smelter was constructed in 1896 at Trail, 12 miles distant by rail. Rossland was incorporated in 1897. Population, in 1901, 6159.

ROSSLAU, rŏs'lou. A manufacturing town of the Duchy of Anhalt, Germany, 4 miles by rail north of Dessau, on the right bank of the Elbe. Chemicals, sealing-wax, paper, machinery, wire goods, sugar, and bricks are manufactured. Population, in 1900, 10,054; nearly all Protestants.

ROSSLYN, rŏs'lĭn. See ROSLIN.

ROSSMÄSSLER, rŏs'mĕs-lĕr, EMIL ADOLF (1806-67). A German naturalist, born in Leipzig, where he was educated. In 1830 he became professor of natural history in the Tharandt School of Forestry, whence he was retired in 1850 because of his political and religious views. Thereafter he devoted himself for several years to popular writings on natural science, in such works as *Der Mensch im Spiegel der Natur* (1850-55), *Die Geschichte der Erde* (1856), *Das Wasser* (1858), and *Der Wald* (1863). His great work was an *Ikonographie der europäischen Land- und Süsswasser-Mollusken* (1835-62), with plates from his own drawings and in many cases lithographed by himself. Consult the autobiography, *Mein Leben und Streben im Verkehr mit der Natur* (edited by Russ, Hanover, 1874).

ROSTAND, rō'stäN', EDMOND (1868—). A French dramatist, born in Marseilles. Early in his career he went to Paris, and produced a volume of verses of little importance, entitled *Les musardises*. His first drama, *Les romanesques* (acted 1894, published 1899), was a success in the rococo style, followed by *La princesse lointaine* (1896, published 1899), and *La Samaritaine* (1897, published 1898), "a gospel in three tableaux," as he called it, mystic and Pre-Raphaelite. All these showed a preciosity of diction and a great talent for supple and sinuous verse. They gave, however, little promise of the joyous brilliancy of *Cyrano de Bergerac* (1897), a success on two continents, and pronounced by Faguet "the finest dramatic poem of half a century," though soberer judgment may pronounce it charming rather than strong. This was founded on the life of an actual personage. (See BERGERAC, SAVINIEN CYRANO DE.) Rostand's next play was historical. *L'Aiglon* (1900) has for its central figure and ineffectual hero the unhappy Duke of Reichstadt, "Napoleon II." If, as is asserted, Rostand's first work is *La Samaritaine*, he began his dramatic development as a disciple of Tolstoy and Maeterlinck, Rossetti and Verlaine. *Les romanesques* is more like the comedies of Musset, "brilliant stuff," as Lemaître has called it, "sparkling with wit and glowing in places with a large and easy gaiety, frank light-heartedness, and plastic grace." *La princesse lointaine* has its scene also in Utopia, here called Tripoli, and in "any period, so that the costume be pretty." The subject, the love of the troubadour prince Jaufré Rudel for the fair Mélisande, which had attracted Heine, Browning, and Swinburne, produces a result more beautiful as a poem than *Cyrano* or *L'Aiglon*, but less dramatically effective in presentation. Besides these dramas Rostand, who calls himself "the poet of preciosity," has depicted what has been styled "a pastel of Roxane's younger sister," in *La journée d'une précieuse*, which shows a member of the charmed circle of the Hôtel de Rambouillet (q.v.) occupied with the innocent artifices of a fashionable bluestocking. Rostand was elected a member of the French Academy in 1901. For a critical estimate of his work, consult: Filon, *De Dumas à*

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Rostand (Paris, 1898). The best of numerous review articles on his work is in the *Edinburgh Review* for October, 1900.

ROSTOCK, rŏs'tŏk. A seaport and the most important city of Mecklenburg-Schwerin, Germany, situated on the estuary of the Warnow, 9 miles from its mouth, and 80 miles east-northeast of Lübeck (Map: Germany, E 1). The town retains its mediæval aspect. Of its squares, the finest is the Blücherplatz, with a bronze statue of Blücher, who was born here. The market place in the centre of the town contains the town hall, an interesting thirteenth-century Gothic structure. The twelfth-century Saint Peter's Church has a tower 433 feet high. There is a fine ducal palace. The new university building, a beautiful Renaissance edifice, was erected in 1867-70. The university library has 175,000 volumes. There is a school of navigation. The city is one of the principal Baltic ports, the exports being chiefly live stock, grain, wool, and flax. Among the manufactures are machinery, woolens, tobacco, sugar, chocolate, carriages, and chemicals. Shipbuilding is carried on. There are also an annual fair, and important wool, horse and cattle markets. Population, in 1890, 44,409; in 1900, 54,713, of whom over 95 per cent. were Protestants. Rostock was a member until 1630 of the Hanseatic-League, and long ranked in importance next to Lübeck among the Baltic cities. The university was founded in 1419. Consult Koppen, *Geschichte der Stadt Rostock* (Rostock, 1887).

ROSTOPTCHIN, or **RASTOPTCHIN**, rŏs-tŏp'chĭn, Feodor Vasilievitch, Count (1765-1826). A Russian general, born in the Government of Orel. He was a Court page of Catharine II., and then entered the army as lieutenant in the Imperial Guard. Paul I. made him a general on his accession to the throne in 1796, and soon after grand marshal of the Court, Minister of Foreign Affairs, and count (1799). Under Alexander I. Rostoptchin remained in banishment till May, 1812, when he was appointed Governor-General of Moscow. On the approach of the French in that year Rostoptchin by extraordinary exertions raised an army of 120,000 men fully equipped, but, to his great chagrin, was ordered to evacuate Moscow. He was held to have caused the burning of Moscow, but in 1823 he published in his own defense *La vérité sur l'incendie de Moscou* (Paris, 1823), in which he declared that this action was due in part to the fervid patriotism of a few of the inhabitants, and in part to the violence and negligence of the French. It is known, however, that Rostoptchin set fire to his own house near Moscow, and that his example was followed by many others, thus making him virtually responsible for the conflagration. In 1814 he was dismissed from office. Subsequently Rostoptchin retired to Paris, where he occupied himself with literary pursuits. In 1825 he returned to Russia. He died at Moscow. Consult: Schnitzler, *Rostopchine et Koutousoff* (Paris, 1863); Ségur, *Vie du comte Rostopchine* (ib., 1872).

ROSTOV, rŏs-tŏf'. One of the oldest towns of Russia, situated in the Government of Yaroslav, on Lake Nero, about 35 miles south of Yaroslav (Map: Russia, E 3). The Kremlin, which is with the exception of that of Moscow the best preserved and most interesting in Russia, is situated on a slight eminence in the centre of the town and is surrounded by a wall one and a half miles in circumference, with numerous battlements and towers of huge dimensions. Inside the Kremlin are situated the thirteenth century Uspensky Cathedral, with relics of many saints, the *white palata* used for Court receptions by the Princes of Rostov, now containing a fine collection of Church antiquities, and the old residence or *terem* of the princes, dating from the fifteenth century. The monasteries of the town and the vicinity are also of great archæological importance and attract many pilgrims. Commercially Rostov is of slight importance, its fair, formerly one of the largest in Russia, having greatly declined, as a result of the building of railways. The manufacture of icons or holy pictures is an important industry. The mediæval Principality of Rostov embraced, besides the present Government of Yaroslav, portions of the governments of Tver, Vologda, Novgorod, and Kostroma. It attained considerable importance and its capital was known as Rostov the Great. The invasion of the Mongols weakened it greatly and it was finally annexed to Moscow by Dmitri Donski (1363-89). Population, in 1897, 13,016.

ROSTOV-ON-THE-DON. One of the principal commercial centres of South Russia, situated at the head of the Don delta, about 40 miles from the Sea of Azov and at the convergence of three important railway lines (Map: Russia, E 5). The town contains large grain storehouses and extensive flour mills, iron works, distilleries, tobacco factories, and saw mills. The total value of its manufactures amounts to about $10,000,000 per annum. Rostov is the centre of the grain trade of Southeastern Russia, and exports grain to the amount of about $17,000,000 per annum. The fairs of Rostov are notable. The educational institutions include a school of navigation and a railway school. There are two libraries. Rostov dates from 1731. Population, in 1897, 119,900, including a considerable proportion of foreigners.

ROSTRA (Lat., beaks). In ancient Rome, the name applied to a great open-air platform of masonry, from which public speakers addressed the people. The ancient rostra received its name in B. C. 338, when Mænius was victorious at Antium, and the beaks (*rostra*) of some of the ships captured were fastened to a platform already erected between the Comitium and the Forum. When Julius Cæsar, in B. C. 44, removed the site of the Rostra to the west end of the Forum, the Græcostasis, a platform for foreign ambassadors, was removed also, and the two platforms were united, forming one continued marble-paved platform, seventy-eight feet long and eleven feet above the level of the Forum. Statues of Sulla and Pompey, two of Julius Cæsar, and many others, adorned the platform. The excavations made in 1899-1900 about the so-called Rostra and Græcostasis have cast doubt upon the identification of the latter, and Boni believes that he has identified the Julian Rostra in the arcaded front of a platform of smaller size by the site previously supposed to be that of the *aureum* (golden milestone), the larger and more prominent platform being that of Imperial rostra of successive restorations.

ROSWITHA, rŏs-vĕ'tâ, **HROTSUITA**, or **HROSWITHA** (c.935-?). A Saxon nun and poet, of noble birth. In her youth she entered

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the aristocratic Benedictine cloister at Gandersheim, near Göttingen, and died there after 1001. She was well schooled in literature and theology. In imitation of Terence she wrote six plays, which show some familiarity with the classics. She also wrote historical works on the deeds of Otho I. and on the early history of Gandersheim. Her works were found and edited by Conrad Celtes, and printed at Nuremberg in 1501. The best and fullest edition is by Barack (Nuremberg, 1858); there is a school edition by P. von Winterfeld (Berlin, 1902). For other editions and works about Roswitha, consult: Potthast, *Bibliotheca Historica Medii Ævi*, vol. i. (Berlin, 1896); Köpke, *Hrotsuit von Gandersheim* (Berlin, 1869).

ROT. A common name for various plant diseases. See DISEASES OF PLANTS; FUNGI, ECONOMIC.

ROTA (Lat., wheel). A tribunal through which the Pope, in the days of his temporal sovereignty, administered justice in disputed cases relating to the temporalities of the Church throughout Christendom, and the more important civil cases of a similar nature from the Papal States. The name possibly came from the circular arrangement of the seats of the judges, or auditors as they were called. The existence of this tribunal cannot be traced back with certainty beyond the thirteenth century. Sixtus IV. in 1472 fixed the number of the auditors at twelve, and succeeding popes gave them many privileges.

ROTARY CONVERTER. See DYNAMO-ELECTRIC MACHINERY.

ROTATION. See MECHANICS.

ROTATION (Lat. *rotatio*, from *rotare*, to rotate, from *rota*, wheel; connected with Ir., Gael. *roth*, Welsh *rhod*, Lith. *ràtas*, wheel, Skt. *ratha*, chariot, OHG. *rad*, Ger. *Rad*, wheel). In plants, the flowing of the protoplasm within the cell wall of certain plants and plant tissues. This may occur when there is a single large central sap-cavity (vacuole), around which the protoplasm lies, or when there are several vacuoles, in which case several currents may be observed in

A CELL FROM A HAIR OF A POPPY (*Chelidonium majus*).
Showing currents in the protoplasm in the direction of the arrows.

different directions at the same time. (See Fig.) These movements seem to be related to the amœboid movements. (See MOVEMENT.) If these are due to changes in surface tension, perhaps brought about by oxidation, rotation may be similarly explained. Nothing, however, is definitely known in this regard. Rotation may be studied readily in the young cells at the tip of Nitella or in the rhizoids of Chara, and in the hairs on the stamens of Tradescantia ('wandering Jew').

ROTATION OF CROPS. The practice of growing various crops from one year to another upon a given field. This practice is followed for the sake of convenience in farm work, and for the purpose of maintaining and increasing the fertility of the soil. The theory of rotation is based on such considerations as the following: Plants differ much in habit of growth and in the proportion of the different elements which they draw from the soil. Deep-rooted plants have a beneficial effect on the physical condition of the soil and are capable of obtaining food and moisture from the subsoil at comparatively great depths, while shallow-rooted plants do not enter the subsoil to such an extent and are, therefore, more dependent upon the surface soil. The quantity and proportion of the crop remaining upon the soil ready to be turned under by the plow differs with the various crops. The cultivation of hoed crops, such as Indian corn, tends to free the land from weeds; leguminous plants enrich the soil in nitrogenous plant food by assimilating the free nitrogen of the air (see CLOVER); and fall-growing crops take up the available nitrogen from the soil and thus prevent its leaching away by the rains of winter and spring. Furthermore, plants having a long season of growth are better adapted to soils with a small supply of available plant food than rapidly growing plants, which need an abundance of available material during their short period of vegetation. The crops consumed upon the farm tend more to maintain fertility than those which are sold; and, finally, crops differing in season, cultivation, and growth allow a convenient arrangement of the farm work throughout the year.

ROTATION OF PLANE OF POLARIZATION. See LIGHT.

ROTCH, ABBOTT LAWRENCE (1861—). An American meteorologist, born in Boston. He graduated at the Massachusetts Institute of Technology in 1884, and in the next year established near Boston the Blue Hill Meteorological Observatory. There he made researches on the clouds and introduced the use of kites for weather observations. Rotch edited, in part, *The American Meteorological Journal* (1886-92), and in 1891 was appointed to the international committee on the nomenclature of clouds. His publications include the annual reports of the Blue Hill Observatory (1887 et seq.) and a popular work, *Sounding the Ocean of Air* (1900).

ROTH, rōt, CHRISTOPH (1840—). A German sculptor, born at Nuremberg. Although for six years a pupil of Sickinger and then of Knabl in Munich, he was largely self-taught. In 1866 he attracted notice through the publication of *Der anatomische Aktsaal*, an instructive work for artists, and soon obtained numerous commissions for portrait busts and statues, among which were those of Bismarck (the first modeled from life by any sculptor), of the philosopher Feuerbach, the monument to the naturalist Siebold, at Würzburg, and some in the military museum of the Royal Arsenal in Munich. His impressive life-size group "Dying" (1899) was acquired by the Zurich Museum. He was awarded several medals and made royal professor.

ROTH, JUSTUS LUDWIG ADOLF (1818-92). A German geologist and mineralogist, born in Hamburg. In 1848 he went to Berlin as privatdocent of geology, and he was made professor there in 1867. Roth published *Die Gesteinanalysen* (1861), *Beiträge zur Petrographie der plutonischen Gesteine* (1869-84), and *Allgemeine und chemische Geologie* (1879-93).

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ROTH, RUDOLF VON (1821-95). A German Orientalist and Sanskrit scholar. He was born in Stuttgart and was educated at Tübingen and Berlin. He continued his studies in Paris and London, and in 1848 received the appointment of extraordinary professor of Oriental languages in Tübingen University, becoming full professor and principal librarian in 1856. His chief work is the monumental *Sanskrit Wörterbuch* (7 vols., Saint Petersburg, 1853-95), compiled in collaboration with Otto von Böhtlingk (q.v.) and published by the Saint Petersburg Academy of Sciences. He edited Yaska's *Nirukta* (1852) and, with Whitney, the *Atharva Veda* (1856-57). His original works include: *Zur Litteratur und Geschichte des Veda* (1846); *Der Atharva-Veda in Kaschmir* (1875); *Ueber Yaçna 31* (1876).

ROTHE, rō'te, RICHARD (1799-1867). A German theologian. He was born at Posen, and became successively member, professor (1828), director, and ephorus (1832) of the theological seminary of Wittenberg. In 1837 he was nominated professor of theology at the University of Heidelberg, which position he exchanged in 1849 for a chair in Bonn. In 1854 he returned to Heidelberg. One of his well-known works is the *Theologische Ethik* (2d ed. 1869), a complete system of speculative theology. Another book is *Die Anfänge der christlichen Kirche*, of which only the first volume appeared (1837), and which, by the peculiar standpoint assumed by the author regarding Church and State, evoked many fierce counter-treatises. His posthumous works are his lectures on *Dogmatik* (1870); *Predigten* (1872); *Vorlesungen über Kirchengeschichte und Geschichte des christlich-kirchlichen Lebens* (1875-76); *Abendandachten über die Pastoralbriefe* (1876-77); *Der erste Brief Johannis* (1878); *Theologische Encyklopädie* (1880); *Geschichte der Predigt* (1881); *Gesammelte Vorträge* (1886). Consult his *Life* by Nippold (Wittenberg, 1873-75).

ROTHENBURG OB DER TAUBER, rō'tenbōōrk ŏp dĕr tou'bĕr. A town of Bavaria, Germany, 30 miles south-southeast of Würzburg (Map: Germany, C 4). It is a very ancient place, and is still surrounded by well-preserved fortifications. It manufactures baby carriages, toys, gold, and silver ware, agricultural implements, and wine. Rothenburg was a free Imperial city from 1274 to 1803. Population, in 1900, 7923.

ROTHERHAM, rŏTH'ĕr-am. A manufacturing town in the West Riding of Yorkshire, England, 6 miles northeast of Sheffield, on the Don (Map: England, E 3). The Free Grammar-School, founded in 1584 and restored in 1858, and the court-house are handsome buildings. There are also an Independent College, a mechanics' institute, an infirmary, and two fine parks. The town owns its gas and water works, and maintains libraries, a museum, and technical schools. Neighboring coal and iron mines furnish materials for the manufactures, the chief of which are stoves, grates, glass, and pottery. The town dates from the Roman period. During the Civil War it sided with the Parliamentarians, was taken possession of by the Royalists in 1643, and retaken by Parliament after Marston Moor. Population, in 1891, 42,100; in 1901, 54,300. In the vicinity are the well-preserved remains of Roche Abbey, erected in 1147, and Conisborough Castle, a massive ancient stronghold, mentioned in Scott's *Ivanhoe*. Consult Guest, *Historical Notices of Rotherham* (London, 1879).

ROTHERMEL, rŏTH'ĕr-mĕl, PETER FREDERICK (1817-95). An American historical painter, born at Nescopack, Pa. He was a pupil of Bass Otis in Philadelphia, and at first painted portraits, but soon devoted himself to historical subjects. From 1847 to 1855 he was director of the Pennsylvania Academy, and in 1856-59 lived in Europe—for two years in Rome. His best works include: "Columbus Before Queen Isabella;" "The Christian Martyrs;" the "Battle of Gettysburg" (1871), Memorial Hall, Fairmount Park, Philadelphia, a gigantic canvas, one of the attractions at the Centennial Fair; and the "Embarkment of Columbus," Pennsylvania Academy. Rothermel was a very prolific painter, possessing some talent for composition, but was deficient in real technical ability. He died near Pottstown, Pa.

ROTHESAY, rŏth'sâ. A seaport and popular watering-place, the capital of Buteshire, Scotland, situated on the island of Bute, at the head of a deep bay in the Firth of Clyde, 40 miles west of Glasgow (Map: Scotland, C 4). The bay offers safe anchorage and is spacious enough to contain the largest fleet, and is regularly entered by nearly all the Clyde steamers to and from the West Highlands. In the middle of the town are the ruins of Rothesay Castle, built about 1103. Rothesay is a favorite resort for invalids suffering from pulmonary affections. Fishing is the employment of a number of the inhabitants, and ship-building is carried on. Population, in 1901, 9,323. Consult Roger, *Rothesay Castle* (London, 1896).

ROTHESAY, DAVID STEWART, Duke of, and Earl of Carrick (c.1378-1402). A Scotch lord, eldest son of Robert III. of Scotland. Upon his father's coronation he became Earl of Carrick; and in 1399, after governing Northern Scotland for more than two years, was made Duke of Rothesay and became Regent of Scotland. About the same time he married Elizabeth, daughter of the Earl of Douglas, thus jilting his fiancée, daughter to the Earl of March, and bringing on Scotland an expedition of revenge led by Henry IV. of England, which accomplished nothing, thanks to Rothesay's strategy and coolness. In 1402, when he had been regent for three years, Douglas, to punish Rothesay's infidelity to his wife, joined with the Duke of Albany, captured the Lord Lieutenant at Strathtyrum and imprisoned him in Falkland Castle, where he died of starvation or—less probably—of disease.

ROTH'ROCK, JOSEPH TRIMBLE (1839—). An American botanist, born in McVeytown, Pa. He graduated at Harvard in 1864, served in the Civil War as captain of Pennsylvania cavalry, and in 1867 completed a course in medicine at the University of Pennsylvania, where, after service on the Wheeler geographical survey, he became professor of botany. He held a like post in the Pennsylvania Agricultural College and became State Commissioner of Forestry. Rothrock published *Flora of Alaska* (1867), *Botany of the Wheeler Expedition* (1878), and *Forestry Reports* of Pennsylvania (1895-97).

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ROTHSCHILD, rŏt'shĭlt, *Eng. pron.* rŏths'-chĭld. A family of European bankers and financiers. The founder of the family, MAYER ANSELM, was born at Frankfort-on-the-Main, in 1743, the son of a Jewish merchant. After some experience as clerk in a counting house at Hanover, he returned to Frankfort and opened a money-exchange business. Being a man of good character and considerable information, he attracted the attention of the Landgrave (afterwards Elector) of Hesse-Cassel. In 1806, when the Elector fled before the French, he intrusted Mayer Anselm with the care of his large private fortune. The merchant fully justified the trust reposed in him; his fame as a financier spread, and he accumulated a large fortune. His three sons, Anselm, Salomon, and Nathan, became associated with him in business, and later on his two youngest, Jakob and Karl, were taken into partnership. Mayer Anselm died at Frankfort, September 19, 1812. All his sons were made barons by the Emperor of Austria in 1822. The oldest, MAYER ANSELM (1773-1855), carried on the business at Frankfort, where he died without issue. The Frankfort business was carried on by the sons of Karl, on the death of the younger of whom in 1901 that firm went into liquidation. SALOMON (1774-1855) became head of a banking establishment at Vienna. He was succeeded by his son Anselm Salomon (1803-74), who was followed by his son Albert (1844—). The third son, NATHAN (1777-1836), founded a branch of the house at Manchester in 1798, and removed in 1803 to London. Large sums of money placed at his disposal were invested with so much judgment that his capital multiplied with great rapidity. KARL (1788-1855) founded a banking house in Naples. JACOB (James) (1792-1868) became chief of the family interests in Paris in 1812, and was succeeded by his son Alphonse (1827-1905). In addition to their five principal establishments the Rothschilds established agencies in many other cities both of the Old and New World. LIONEL (1808-79), eldest son of Nathan, and head of the London house, was born in London, and was educated at Göttingen. He was elected to Parliament for London in 1847, 1849, 1852, and 1857, and at each election claimed the right to take the oaths and his seat in the House of Commons. The latter words of the oath—"on the true faith of a Christian"—he insisted upon omitting, "as not being binding on his conscience." He was then desired to withdraw from the House. In 1858 he was placed on a committee which was to hold a conference with the House of Lords, and this was virtually the means of establishing Jewish emancipation. The Commons sent up another bill, and the Lords gave way, merely taking measures to prevent the admission of Jews into the Upper House. Lionel Rothschild thereupon (July, 1858) took the oaths and his seat. He sat till 1868, when he was defeated, but was reëlected in 1869, and again lost his seat in 1874. The descendants of the five brothers still carry on the large financial and banking operations of the firm. Lionel's son, NATHANIEL (1840—), was raised to the British peerage in 1885 with the title of Baron Rothschild. Consult: Reeves, *The Rothschilds* (London, 1887); De Schreb, *Geschichte des Hauses Rothschild* (Berlin, 1892); Demachy, *Les Rothschilds* (Paris, 1896).

ROTH'WELL. A town in the West Riding of Yorkshire, England, 4 miles south of Leeds (Map: England, E 3). It has collieries, stone quarries, and rope and match factories. Population, in 1901, 11,700.

ROTIF'ERA (Neo-Lat. nom. pl., from Lat. *rota*, wheel + *ferre*, to bear) or ROTATORIA. A group of minute animals, the 'wheel-animalcules,' including many of the smallest of multicellular animals. They form a class of the phylum Trochelminthes (q.v.). They are almost without color, though with pigment-eyes in most cases, and are generally microscopic. They occur in both fresh and salt water in all parts of the earth and many species are nearly cosmopolitan in their distribution. They are now regarded as highly specialized or degenerate worms, but their nearest relatives are still undetermined. Rotifers are only slightly elongated animals, covered with a smooth, hard, chitinous cuticle, generally marked off into six folds or sections, but there is no internal evidence of any true segmentation. The body usually ends in a prolongation popularly called a 'tail,' but known to zoölogists as the 'foot.' It is composed of muscular and glandular tissues and often terminates in a pair of forceps by which the animal can attach itself to leaves and other objects. At the anterior end of the body are a pair of ciliated disks, with the mouth between them. These disks are rarely circular in outline, but are usually lobed on the margin, or may even be separated into two disks. The margin of each disk is surrounded by one or two bands of cilia, by means of the constant movement of which food is collected and swept into the mouth, and this movement is so rapid and uniform that the entire disk appears to revolve, and thus have arisen the various names of the group. Not only do these ciliated organs serve for collecting the food, but they are also the means of locomotion, rotifers swimming about gracefully, though not with remarkable rapidity, by means of them. They are entirely under the control of the animal. The digestive apparatus is well developed in the female, but in the males it consists of only the pharynx and cloaca. The nervous system consists of a cerebral ganglion with radiating fibres. Eyes are also present in many rotifers, but they are merely pigment spots, rarely provided with a lens. There is no circulatory system, but excretory organs are well developed. The female reproductive organs consist of a round or oval ovary, lying beside the stomach, and an oviduct opening into the cloaca. Two different kinds of eggs are produced, thin-shelled summer eggs and thick-shelled winter eggs. (See EGG.) Males are very rare, and in many species are as yet unknown to science. They are much smaller than the females and of much simpler organization, and are produced mostly by the last laying of small summer eggs, each season. The males are very short-lived and hence have little need of a digestive canal. Consult: Parker and Haswell, *Text-Book of Zoölogy* (New York, 1897); Hudson and Gosse, *The Rotifera or Wheel Animalcules* (London, 1889). For an account of the rotifers of the United States, consult Jenning, "Rotatoria of the United States," in *Bulletins* of the United States Fish Commission for 1899 (Washington, 1900).

ROTROU, rō'trōō', JEAN DE (1609-50). A French dramatist, born in Dreux. At nineteen he was successful on the stage with *L'hypocondri-*

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aque. About 1635 Richelieu made him one of the famous five employed to write tragedies from his plots. Rotrou's earlier plays were mostly based on Spanish dramas, especially on those of Lope de Vega; and at a later period he was more clearly under classical influence. Corneille also influenced him considerably. The more important of his plays are: *La bague d'oubli* (1635); *Cléagénor et Doristée* (1635); *Venceslas* (1648), a tragedy which long held the stage; and *Cosroès* (1648), probably his best tragedy. A complete edition was brought out by Viollet-le-Duc (Paris, 1820 et seq.). Consult: Jarry, *Essai* (Paris, 1868); Chardon, *La vie de Rotrou* (ib., 1884).

RÖTSCHER, rĕt'shĕr, HEINRICH THEODOR (1803-71). A German dramatic critic. He was born in Mittenwalde, studied at Berlin and Leipzig, and from 1828 to 1845 was professor in the Gymnasium of Bromberg. Then he became dramatic critic to the *Spenersche Zeitung* of Berlin. His principal work is the *Kunst der dramatischen Darstellung* (1841-46; 2d ed. 1864). Among his works may be mentioned *Aristophanes und sein Zeitalter* (1827) and *Abhandlungen zur Philosophie der Kunst* (1837-47), both strongly tinged with Hegelianism; *Shakespeare in seinen höchsten Charaktergebilden* (1864); *Dramaturgische und ästhetische Abhandlungen* (1864-67); and *Seydelmanns Leben und Wirken* (1845).

ROTTENHAMMER, rŏt'ten-häm'ĕr, JOHANN (1564-1623). A German historical painter, born at Munich. He was a pupil there of Hans Donauer from 1582 to 1590, studied afterwards in Venice after Tintoretto, went thence to Rome in 1605, and settled at Augsburg in 1607. His best pictures are those on a small scale, to be found in all the principal galleries of Europe. He supplied the figures in some of the landscapes of Jan Breughel and Paul Bril. A good example of his early style, in which he approaches Tintoretto, is the "Death of Adonis," in the Louvre. Among his best works are those painted for Emperor Rudolph II., including a "Nativity" (1608), "Battle Between Centaurs and Lapithæ," and four others, in the Vienna Museum.

ROTTEN ROW. A fashionable bridle-path in Hyde Park, London, 90 feet wide, extending for a mile and a half from Hyde Park Corner to Kensington Gate, along the south side of the Serpentine. It runs parallel with the driveway, from which it is separated by a promenade fringed with turf. Some of the most brilliant displays of fashion and wealth in London are to be seen here on fine afternoons during the season, and at the church parade on Sundays. The name is supposed to be derived from Route de Roi or King's Drive.

ROTTEN-STONE. A soft abrasive material that is used for cleaning and polishing brass and other metals, and wood. It is supposed to be a decomposed siliceous limestone, and consists essentially of aluminum silicate with carbonaceous matter. Several localities in Derbyshire, England, in Wales, and near Albany, N. Y., in the United States, are the principal sources.

ROTTERDAM, *Dutch pron.* rŏt'tĕr-dăm'. The second largest city and chief commercial port of the Netherlands, situated in the Province of South Holland, on the Meuse at the mouth of the Rotte, about 15 miles southeast of The Hague and 44 miles south-southwest of Amsterdam (Map: Netherlands, C 3). It is divided into two parts by the Hoog Straat (High Street) and is intersected by an iron railway viaduct. Adjoining the old city on all sides are the new quarters which have sprung up on the southern as well as on the northern bank of the river and are generally well laid out. Along the Meuse extends the beautiful quay known as the Boompjes, on account of its many trees. The principal square is the Groote Markt. Rotterdam has few ecclesiastical buildings of interest. The Groote Kerk is a fifteenth-century brick edifice, built in the Gothic style and containing an organ notable for its size, and many monuments to Dutch naval heroes.

Among the secular buildings the following deserve mention: the exchange, a sandstone building of the beginning of the eighteenth century, with an exterior court, and a tower containing a set of chimes; the town hall; the court-house; and the post-office. On the northern side of the town is the Delft Gate, the only one remaining of the old city. Beyond it is situated the fine zoölogical and botanical garden, founded in 1857. West of the city is a fine park. The principal collection of Rotterdam is the large picture gallery in the Boyman's Museum, containing numerous excellent paintings and drawings by Dutch masters. In the ground floor of the museum are the municipal archives and library. There are also interesting collections in the maritime museum. The municipality operates gas and electric plants and maintains a pawnshop. The water supply is obtained from the Meuse and is purified by filtration.

The principal industry is shipbuilding; of some importance are the manufactures of cigars, spirits, paints, and other chemicals, and sugar. The Rotterdam system of docks and harbors is among the most extensive in the world. A canalized arm of the Meuse known as the *Nieuwe Waterweg* extends from Rotterdam to the North Sea. The position of Rotterdam makes it the centre of the maritime as well as of the Rhine and Meuse trade of the Netherlands. Its commerce shows an extraordinary increase from 1850 to 1900. Its share in the shipping of the country in 1900 amounted to 63 per cent. (or 5,816,928 tons) of the tonnage entered and 47 per cent. (or 2,191,614 tons) of the tonnage cleared.

The chief imports are grain, ores and metals, petroleum, coffee, tobacco and cigars, tea, and skins. The exports consist chiefly of the above mentioned articles and include also timber and animal products. Rotterdam has regular steam communication with the principal seaports of Europe as well as with the United States, Dutch East Indies, and Africa. The population increased more than 50 per cent. from 1890 to 1900, on account of the annexation of the adjacent communities. It rose from 203,701 in 1889 to 318,507 in 1900. The inhabitants are mostly Protestants.

Rotterdam received municipal rights in 1299 and grew so rapidly that its boundary lines were repeatedly extended. It gained its commercial ascendency during the nineteenth century.

ROTTI, rŏt'tê. An island of the Dutch East Indies, situated near the southwestern end of Timor (Map: East India Islands, F 7). It has an area of 637 square miles. It is fertile and well watered, producing rice, tobacco, sugar, cotton, and indigo. The island is still ruled by native chiefs under the supervision of a Dutch resident

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at Baï, and forms a part of the Dutch residency of Timor. The population is estimated at 80,000, principally Malays.

ROTTMANN, rôt'mân, KARL (1798-1850). A noted German landscape painter, born at Handschuchsheim, near Heidelberg. He formed himself chiefly through the study of nature and of great masterworks, and after gaining prominence by "Heidelberg at Sunset" (water color), and "Castle Eltz," he settled in Munich (1822), devoting himself to Bavarian scenery. His success in characterizing the main features of a landscape, and producing ideal effects in line and color, created a new epoch in landscape painting. During his travels in Italy (1826-28) he made sketches for the 28 Italian landscapes in fresco which he was commissioned to paint in the arcades of the Hofgarten at Munich (1829-33) and which constitute Rottmann's most sterling work, but unfortunately deteriorated under climatic influences. The cartoons for them are in the Darmstadt Gallery. In 1834-35 he was in Greece, and the results of this journey were 23 Greek landscapes, which were placed in a special room in the New Pinakothek, Munich. Of his easel pictures "Ammer Lake" and "Marathon" are in the National Gallery, Berlin; "The Acropolis of Sikyon" and "Corfu" in the Pinakothek, Munich; others in the Schack Gallery, Munich, and in Karlsruhe; and seven in the Leipzig Museum. Consult: Pecht, *Deutsche Künstler*, ii. (Nördlingen, 1879); and Regnet, in Dohme, *Kunst und Künstler*, iv. (Leipzig, 1885).

ROTY, rô'tē', LOUIS OSCAR (1846—). A French medalist and engraver, born in Paris. He was a pupil of Ponscarme and Dumont, and won the Prix de Rome in 1875. His subjects are treated with remarkable skill in obtaining the most delicate results. His portraits are also admirable. With Chapu, Degeorge, and Chaplin, he ranks as the greatest reviver of medallic art in France during the last century.

ROUARIE, rōō'ä'rē', MARQUIS OF. See ARMAND, CHARLES.

ROUBAIX, rōō'bā'. A manufacturing town in the Department of Nord, France, 7½ miles northeast of Lille (Map: France, K 1). Its rise dates from the first quarter of the nineteenth century, when its population was 9000 and rapidly increased after the establishment of modern textile industries. The annual value of its textiles is over $80,000,000. There are also other manufactures. The town possesses the important Ecole Nationale des Arts Industriels. Population, in 1901, 124,365.

ROUBILLAC, rōō'bē'yāk', or **ROUBILLIAC,** LOUIS FRANÇOIS (1695-1762). A French sculptor, born at Lyons, France. He studied under Nicolas Coustou and then under Balthazar. About 1738 he settled in England, where he executed many well-known works. His most important monuments are those of John Campbell, Duke of Argyll, of Mrs. Nightingale, and of Handel (1761), in Westminster Abbey; the statue of Newton (1755) at Trinity College, Cambridge; and the statue of Shakespeare (1758), in the British Museum. Among his busts from life, which are his best works, are those of Hogarth (National Portrait Gallery), Garrick (Garrick Club), and Handel (Foundling Hospital), all in London. His style is mannered, but is not without grace, and his portrait busts are highly characteristic.

ROUCOUYENNE, rōō'kōō'yĕn'. A tribe of Cariban stock (q.v.) in the mountain country about the headwaters of Maroni River, French Guiana. They take their name from the roucou, a vegetable coloring matter with which they paint their skins. They are naturally of light complexion. Marriages of father and daughter and of brother and sister are said to be common among them.

ROUEN, rōō'ăn'. The capital of the Department of Seine-Inférieure, France, on the Seine, 87 miles northwest of Paris by rail (Map: France, H 2). It is one of the principal manufacturing and trading cities of France. It stands on the north bank of the river, on level ground slightly rising toward the east. Some of the streets are regularly built, traversed by street railways, and lined by fine modern stone houses, but the majority are of the mediæval, ill-built, and narrow though picturesque order, crowded with lofty, quaintly carved timbered houses with overhanging gables. A stone bridge and a suspension bridge connect the faubourg Saint Sever, on the left bank of the river. A viaduct across the river connects the Western with the Orleans railway. The site of the former encircling ramparts is now occupied by spacious, tree-bordered boulevards, which, as well as the quays that line the river banks for a distance of a mile and a half, rival the boulevards and quays of Paris.

Rouen is noted for its ecclesiastical architecture, of which the finest specimens are the Cathedral and the Church of Saint Ouen. The former is a remarkably fine specimen of Gothic architecture. It is of cruciform shape and has two towers at the sides of the west entrance, and a lofty but incongruous tower, 464 feet high, which was constructed after the destruction by fire in 1822 of the belfry, which bore the date of 1544. The cathedral was erected by Philip Augustus between 1200 and 1220, and contains in its 25 highly ornamented chapels numerous monuments of great interest. The Church of Saint Ouen is as large as the cathedral and in its restored state presents a pure and elegant specimen of Gothic architecture. Other notable churches are the fifteenth-century flamboyant Gothic Church of Saint Maclou, the sixteenth-century churches of Saint Vincent, Saint Godard, and Saint Patrice, and the restored Romanesque Church of Saint Gervais, with a fourth-century crypt. Of the secular buildings the finest are the Palais de Justice, belonging to the fifteenth century and built for the Parliament of the province; the Hôtel de Ville, with its well-equipped public library and its gallery of pictures; the Hôtel Dieu or hospital, one of the largest of its kind; the fifteenth-century Hôtel Bourgthéroulde (now used as a bank) ornamented with historical reliefs; and the striking fourteenth-century belfry or Tour de la Grosse Horloge, with its double-dialed and richly sculptured clock on a sixteenth-century arch spanning the street. The finest square is the Place de l'Hôtel de Ville. Joan of Arc was burned in the Place du Vieux Marché (since 1902 decorated with a fine memorial of the Maid of Orleans), and not in the Place de la Pucelle, where a mean-looking statue marks the spot that was long pointed out as the site of her martyrdom. The town possesses a

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museum with valuable art and other collections, including a library of 140,000 volumes. Rouen is the seat of an archbishop.

The artificially deepened waters of the Seine form a commodious port admitting vessels of 5,000 tons. There is a large export and import trade, chiefly with Great Britain, Spain, Russia, Italy, and the United States. The principal industry is the manufacture of cotton goods, including the checked and striped cottons especially designated as Rouenneries, lace, cotton velvets, shawls, etc. There are also extensive manufactures of hosiery, mixed silk and wool fabrics, blankets, flannels, shot, chemicals, and refined petroleum. Among other branches of industry are ship-building and the manufacture of machinery. Population, in 1901, 116,316.

Rouen is the ancient Rotomagus, which under the later Roman emperors was the capital of Lugdunensis Secunda. It figures early as the seat of a bishop. Rollo, with his Northmen, settled here at the close of the ninth century, and the town became the capital of the Duchy of Normandy. It was wrested from King John of England by Philip Augustus in 1204. It was in the hands of the English from 1419 to 1449, and Joan of Arc was buried here in 1431. Rouen was a Huguenot stronghold. It was occupied by German troops in the war of 1870-71. Consult: Périaux, *Histoire de la ville de Rouen* (Rouen, 1874); and Cook, *Story of Rouen* (London, 1899).

ROUERGUE, rōō'ärg'. A mediæval county of France, the capital of which was Rodez (q.v.).

ROUERIE, rōō'e-rē', MARQUIS OF. See ARMAND, CHARLES.

ROUGE, rōōzh (Fr. *rouge*, OF. *rouge, roge*, red, from Lat. *rubius, rubeus*, red; connected with *ruber, rufus*, red, and ultimately with Eng. *red*). A preparation of safflower, used to give an artificial color to the cheeks. The color is obtained through a long and elaborate process by precipitating it from the safflower, by means of citric acid or lemon-juice, on to prepared cotton. It is then washed out of the cotton with a solution of soda, and again precipitated with citric acid; but previous to adding the acid, finely powdered French chalk is added to the solution, which becomes colored and falls down when the precipitation takes place, giving the necessary body and a peculiarly silky lustre to the coloring matter. (For rouge as a polish material, see ABRASIVES.) *Jeweler's rouge* is a preparation of iron formed by calcining sulphate of iron, or green vitriol, until the water of crystallization is expelled; it is then roasted in a strong heat, and afterwards washed with water, until it no longer affects litmus paper. *Liquid rouge* is the red liquor left in making carmine.

ROUGÉ, rōō'zhâ', OLIVIER CHARLES EMMANUEL, Vicomte de (1811-72). An eminent French Egyptologist, born in the Department of Sarthe. He at first studied law, but soon took up with ardor the study of Egyptian. His first memoir placed him among the foremost of living Egyptologists. It was a refutation of the theories of Bunsen and was published (1846-47) in *Annales de philosophie chrétienne* under the title: *Examen de l'ouvrage du chevalier de Bunsen, La place de l'Egypte dans l'histoire du monde.* In 1849 he was appointed keeper of the Egyptian collection of the Louvre. He made a valuable catalogue of the Paris collections (*Notice sommaire des monuments égyptiens du Louvre,* 1st ed., Paris, 1849; 3d ed. 1855). In his *Mémoire sur l'inscription du tombeau d'Ahmès* (1849) and his *Etude sur une stèle égyptienne* (1856) he for the first time gave connected translations of entire hieroglyphic inscriptions, and established the principles upon which the systematic study of these texts should proceed. His *Chrestomathie égyptienne* (4 vols., Paris, 1867-76) placed the study of Egyptian grammar upon a new footing, and in his *Recherches sur les monuments qu'on peut attribuer aux six premières dynasties de Manéthon* (Paris, 1864-65) he made a most valuable contribution to early Egyptian history. In 1860 he became professor of Egyptology in the Collège de France. After his death was published the valuable collection *Inscriptions hiéroglyphiques copiées en Egypte* (Paris, 1877-79).

ROUGE DRAGON. See PURSUIVANT.

ROUGET DE L'ISLE, rōō'zhâ' de lēl, CLAUDE JOSEPH (1760-1836). A French poet and composer. He was born at Lons-le-Saunier. It was at Strassburg on the night of April 24, 1792, that Rouget de l'Isle, then a captain of engineers, wrote the immortal *Marseillaise.* (See article MARSEILLAISE.) A few days later he was suspended from his rank because he refused to sanction the extreme measures of the Revolutionary Party. After a two months' exile in Alsace, he entered the army again as a volunteer under General Valance, who restored him to his former rank. During the Reign of Terror he was again proscribed, and was confined to the prison of Saint Germain-en-Laye, on being released from which after the fall of Robespierre, he composed the "Hymn of the Ninth Thermidor." Later he served with Tallien's army, and was wounded at Quiberon, after which the Convention endeavored to atone for former injustice done him by giving him substantial promotion. In 1796 he abandoned military life and went to Paris to devote himself to poetry and music. In 1830 he was pensioned by Louis Philippe. His published works include: *Chant des vengeances* (1798); *Chant du combat* (1800); 50 *Chants français* (1825); and the libretti to a few operas.

ROUGE ET NOIR, rōōzh â nwär (Fr., red and black), or TRENTE ET QUARANTE. A game famous throughout Europe and a favorite mode of gambling. It is played on a long table covered with a green cloth at each end of which there are two lozenge-shaped figures marked 'rouge' (red) and 'noir' (black), and colored accordingly. There are two centre divisions known as 'couleur,' and at each end a triangular division known as 'inverse,' the opposite of couleur. The stake or bet may be placed on four different risks according to the division of the table the player prefers. Six packs of cards are used shuffled together, each player shuffling a part of them, after which the whole are shuffled by the banker or dealer, who is always seated in the middle at one side of the table. The 'croupiers' sit facing the banker, and attend to all receipts and payments. The game begins by the dealer taking a single card, which is usually the blank one, and presenting it to one of the players, who inserts it in the complete pack at any point he desires. This constitutes the cut, after which the

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banker, taking a convenient handful from the top of the cut, deals one card face upward; the suit of this card is an important factor of the game. The dealer continues to deal the cards (face upward) alternately on either side of the card first dealt, until the aggregate in face value of the cards dealt amounts to or exceeds 31. In arriving at a total all court cards count as 10, and the remainder according to the number of their pips. This first row of cards belongs to 'noir.' The second row is then dealt in like manner until 31 or the nearest over that amount is reached. The row nearest that number wins, and the winners receive an amount equal to their stake. If 'couleur' is played it is understood that the player is wagering that the winning color will be the same as that of the first card dealt; similarly, the players who have placed their stakes 'inverse' wager that it will be of the opposite color. A *refait* or tie is where both rows of cards aggregate the same total (from 32 to 40, inclusive); in which case the players neither pay nor receive. If the total, however, come to 31, the bank is entitled to half the stakes, and the player has the option of paying the half accordingly, or wagering the whole by placing it within certain lines marked on the table and known as *la première prison* (the first prison) until the result of the next hand is declared. If the player wins, the entire stake is his; if the contrary is the case, the stake belongs to the bank.

ROUGHLEG. An American buzzard-hawk of the genus Archibuteo. See BUZZARD; and Plate of EAGLES AND HAWKS.

ROUGH RIDERS ASSOCIATION. A patriotic hereditary society, organized in 1899. It has for its objects the preservation of the memories of the war with Spain, and of promoting a lasting friendship among the members of the First Regiment of the United States Volunteer Cavalry, generally known as the Rough Riders. There are about 100 names on the roll.

ROUGH-WINGED SWALLOW. A swallow of the genus Stelgidopteryx, much like the bank swallow (q.v.), but peculiar in that the edge of the wing is roughened by having the ends of the web-fibres bent into hooks. The common species of the United States is *Stelgidopteryx serripennis*. It is widely distributed in summer, breeding in bank burrows and in holes and crannies about cliffs, quarries, bridge-piers, and the like, where the rough edges of its wings may help it to climb and cling. It is sooty brown above, mouse-gray on the breast and sides, and white below.

ROUGON-MACQUART, rōō'gôn' mȧ'kär', LES. A famous series of romances by Emile Zola, in which it was the author's purpose to follow out the problems of heredity as exhibited in the persistence of family characteristics under different environments. The series was intended to present the social history of a family under the Second Empire, but the short duration of that form of government made great compression necessary, and produced unavoidable obstacles of chronology. Zola planned 12 volumes, but extended the design to 20, to which *Lourdes* (q.v.) and *Rome* (q.v.) were later added. In the first volume the congenital nervous disease of Adelaïde Tongue is the starting point of the tendencies exhibited in the descendants of her three children, Pierre, Antoine, and Ursule Macquart. The lines of development gave Zola opportunity to paint the life of many divisions of society, and in all the volumes he made intensive studies of the special class under review, fortifying his personal observation by facts drawn from all sources, and striving to present a truthful picture of conditions. The volumes of the series are: *La fortune des Rougon* (1871); *La curée* (1871); *Le ventre de Paris* (q.v.) (1873); *La conquête de Plassans* (1874); *La faute de l'abbé Mouret* (1875); *Son excellence Eugène Rougon* (1876); *Une page d'amour* (1878); *Nana* (q.v.) (1880); *Pot-Bouille* (1883); *Au bonheur des dames* (1883); *La joie de vivre* (1884); *Germinal* (q.v.) (1885); *L'œuvre* (1886); *L'assommoir* (1887); *La terre* (q.v.) (1887); *Le rêve* (q.v.) (1888); *La bête humaine* (1890); *L'argent* (1891); *La débâcle* (q.v.) (1892); and *Le docteur Pascal* (1893).

ROUHER, rōō'ȧ', EUGÈNE (1814-84). A French statesman, born at Riom, in the Department of Puy-de-Dôme. He first distinguished himself as an advocate in his native town, where he practiced up to 1848. In that year he was elected to the Constituent Assembly, and in 1849 he was returned to the Legislative Assembly. On the break-up of the first Ministry of Louis Napoleon, toward the end of 1849, Rouher was appointed Minister of Justice in the new Ministry, and with slight interruptions he was a member of the Government, chiefly as Minister of State, up to 1870. In the negotiation of the treaty of commerce with England in 1860, which conferred great advantages upon both countries, Rouher represented France and Cobden England. In 1863 he negotiated a treaty of commerce between France and Italy. Through these treaties, and others with Belgium and Germany, Rouher was active in furthering the cause of free trade. In July, 1869, his Ministry resigned. On the downfall of the Empire in 1870 he fled to England, but soon returned to France and in 1872 was elected a member of the National Assembly from Corsica.

ROULERS, rōō'lȧ', or **ROUSSELAERE,** rou'se-lär. A town of the Province of West Flanders, Belgium, on the Mandelbeke, a tributary of the Lys, 14 miles northwest of Courtrai (Map: Belgium, B 4). The Church of Saint Michael has a beautiful Gothic tower. Roulers has long been famous for its linen industry. There is an immense output of linen, lace, silk, ribbons, and cotton. In 1794 the Austrians under Clerfait were defeated here in a fierce battle by the French under Pichegru and Macdonald. Population, in 1900, 23,231.

ROULETTE. A game of chance, usually associated with public gambling. The wager is as to which hole out of 38 in the circumference of a sunken circle on a table a small ivory ball will fall into. The centre of the bed of the machine is set in motion by turning, with the forefinger, the cross which surmounts it, from right to left, causing a rotary motion. At the same instant a little ivory ball is thrown into the concavity of the wheel in a direction opposite to its motion. The ball flies about erratically at first, but gradually slows down and ultimately falls into one of the cavities. A few seconds before it stops the banker has the privilege of warning the spectators that it is too near its final selection for any more bets to be made.

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ROULROUL (Malay name). A beautiful small crested partridge of the Malayan Islands and Borneo, two species of which are contained in the genus Rollulus. They dwell in the forests in small flocks, and are extremely active. See Plate of PARTRIDGES, ETC.

ROUMANIA. See RUMANIA.

ROUMANILLE, rōō'mȧ'nē'y', JOSEPH (1818-91). A Provençal poet. He was born at Saint-Remy (Bouches-du-Rhône). He is commonly known in Southern France as the father of the Félibrige; for he first conceived the idea of raising the patois of his region to the dignity of a literary language. When Roumanille was a teacher in Avignon, he discovered the genius of Frédéric Mistral, one of his pupils, and together they began what later became the Félibrean movement. In 1847 Roumanille published a volume of verse called *Li Margarideto,* and in 1851 another entitled *Li Sounjarello.* In 1852 along with Mistral and Anselme Mathieu he edited a collection of Provençal verse called *Li Prouvençalo.* In 1853 he wrote a dissertation on Provençal spelling. His writing is of the wholesome, simple sort, adapted to the country-folk of the region. The complete edition of his works includes *Lis oubreto en verse, Lis qubreta en proso, Li capelan, Li conte prouvençau e li cascareleto, Li nouvé, Lis entarrochin,* and *Letters.*

ROUND (OF., Fr. *rond,* It. *rotondo, ritondo,* from Lat. *rotundus,* round, wheel-shaped, from *rota,* wheel). In music, a short vocal composition, in three or more parts, all written on the same clef. Each voice takes up the subject at a certain distance after the first has begun. The second voice begins the first part when the first begins the second part, and the third takes up the first part when the second begins the second part, the whole ending together at the mark of a pause, or at a signal agreed on. The round is really an *infinite canon.* It was very popular in England from early times. The famous round *Sumer is icumen in* is assigned to the thirteenth century. Originally the round was identical with the catch, but the latter became of a humorous character, while the former remained serious. See CATCH.

ROUND, WILLIAM MARSHALL FITTS (1845—). An American prison reformer, journalist, and novelist, born in Pawtucket, R. I. After public-school training Round entered the Harvard Medical School, did not graduate, was given charge of the New England Department of the World's Fair, Vienna (1873), engaged in journalism in Boston and New York, was associate editor of the Boston *Globe,* and afterwards on the staff of the *Independent.* In 1883 he was elected corresponding secretary of the Prison Association of New York, and of the National Prison Association. He was also a delegate from the United States to the International Penitentiary Congresses at Rome (1886) and Paris, and to the Congress of Criminal Anthropology at Brussels, and planned (1887-88) the Burnham Industrial Farm for Unruly Boys, at Canaan, N. Y. His books include: *Achsah, a New England Life Study* (1876); *Child Marian Abroad* (1876); *Torn and Mended* (1887); *Hal, the Story of a Clodhopper* (1878); and *Rosecroft* (1880). See PRISON ASSOCIATION, NATIONAL.

ROUNDABOUT PAPERS. A collection of delightful essays by Thackeray, contributed to the *Cornhill Magazine* in 1859-63, and published in 1863.

ROUNDEL. See FORTIFICATION.

ROUNDERS. An outdoor ball game. The game has long been popular with boys in England, and is the father of the more scientific and highly developed American baseball. Nine on each side play. The 'in' side bat in rotation on a home base and the striker drops the bat before he runs, for the use of the next batsman. The pitcher, or, as he is called, 'the feeder,' occupies the same relative position as in baseball. The 'out' side fields for the side that is 'in,' and must put the runners out by a catch or by striking them when between bases, or by touching an empty base to which the runner is approaching. There are six bases. Every player has the option of refusing to strike at as many balls as he pleases, or three only if so arranged, but whether he hits the ball or not (with one exception) if he strikes at it he must run. The ball is dead when it leaves the feeder's hands until it has been struck at by the player, and no one may move from his base while the ball is dead. The players on the 'in' side when reduced to two may select one of their number to make what is termed 'three hits for a rounder;' the player not selected then retires. The selected one has to be served with the ball until he has had three trial hits thereat, and on the third hit or attempt (if not before) he must run from the home base, round to every base in succession, and back again to home, without being hit with the ball, and without it being grounded at the home base while he is running. If the round is successfully made his side is again all in. If the contrary the sides change places.

ROUNDFISH. One of the American lake whitefish. See WHITEFISH.

ROUNDHEADS. A name contemptuously used of the English Puritan or Parliamentarian Party in the time of Charles I., originating in their fashion of wearing the hair short, while the Cavaliers wore flowing locks.

ROUND POMPANO. See POMPANO.

ROUND TABLE. The name commonly given to the fellowship of knights which gathered around King Arthur, from the table at which they sat in the hall of his palace. See ARTHUR; MORTE D'ARTHUR.

ROUND TOWERS. Tall narrow towers tapering gradually from the base to the summit, and found abundantly in Ireland, and occasionally in Scotland, are among the earliest and most remarkable relics of the ecclesiastical architecture of the British Islands. They are the work of Christian architects, and seem to have been in all cases attached to the immediate neighborhood of a church or monastery, and were capable of being used as strongholds in times of danger. After the introduction of bells, they were also probably used as bell-towers. They are usually capped by a conical roof, and divided into stories, sometimes by yet existing floors of masonry, though oftener the floors were made of wood. Ladders were the means of communication from story to story. There is generally a small window on each story, and four windows immediately below the conical roof. The door is in nearly all cases a considerable height from the ground. The tower at Devenish, in Ireland, which may be considered

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as a typical example of the class, is 82 feet high, and is furnished with a conical cap. A battlemented crown occasionally supplies the place of the conical roof, and in one instance the base of the tower is octagonal. They are usually assigned to a period ranging from the ninth to the twelfth century. The source of this form of tower has not yet been cleared up. The only group of related examples of earlier data are the round towers of the churches of Ravenna dating from the sixth and seventh centuries, such as those of both basilicas of Sant' Apollinare, of San Vitale, the Cathedral, and Santa Maria Maggiore.

ROUNDWORM, or THREADWORM. A nematode, specifically *Ascaris lumbricoides*, which occurs in the human intestine and resembles an earthworm. It is milk-white in color, and has three lips, which when pressed down upon the wall of the intestine of its host form a sucker, in the centre of which is the mouth. The female is larger than the male, sometimes 16 inches long, while the male is 10 or less. The female also seems to be more common. The eggs are very numerous, are fertilized within the body of the mother, and have usually begun their development when laid, but ordinarily pass out of the intestine of the host and remain in a dormant condition until they are finally taken into the alimentary canal of some other human being, probably in most cases by drinking impure water, although eating fresh leaves, fruits, and roots may be an important means. It is said that geographical and climatic conditions have much to do with the frequency of the parasite. For other species of these worms parasitic in domestic animals, see ASCARIS; also THREADWORM.

ROUP (from *roup, roop*, AS. *hrōpan*, OHG. *hruofan, ruofan*, Ger. *rufen*, Goth. *hrōpjan*, to cry out), DIPHTHERITIC ROUP. A supposedly contagious disease of poultry resembling diphtheria in man, but attributed to a different organism. Diphtheritic patches appear on the mucous membranes. The measures to adopt in combating roup are isolation of all affected birds and a thorough disinfection of the premises with a 5 per cent. solution of carbolic acid. All birds that have died of roup should be burned or buried. Consult: *Delaware Agricultural Experiment Station Bulletin 47; Montana Agricultural Experiment Station Bulletin 22; Rhode Island Agricultural Experiment Station Reports, 1898*, p. 97; *1889-1900*, p. 233.

ROUS, FRANCIS (1579-1659). An English writer on theology. He was born at Dittisham, Devonshire; graduated B.A. at Oxford (1596-97); subsequently at Leyden (1598-99); studied law (1601), but subsequently confined himself to theology and attained high rank among the Presbyterians, and after 1649 among the Independents. He was an intimate friend of Pym (q.v.), a member of several Parliaments, and supported Cromwell and the Commonwealth. He is remembered for his *Psalms of David in English Meeter* (1643), which was adopted by the Westminster Assembly, and estates of Scotland, and authorized by Parliament for general use.

ROUSAY, rōō'sâ. One of the Orkney Islands (q.v.).

ROUSSEAU, rōō'sō', JEAN BAPTISTE (1670-1741). A French lyric poet, born in Paris. Though a shoemaker's son, he was well educated, enjoying the patronage of Boileau and Breteuil, and of Talland, whom he accompanied as secretary to London. He won reputation for stinging satires, directed especially against La Motte and Saurin. La Motte retaliated by compassing Rousseau's defeat in an academic election (1710). Rousseau accused Saurin of circulating libelous epigrams as his own; but he could not legally prove this and was banished (1712). Rousseau lived in Switzerland, Austria, Belgium, and England. His epigrams are brilliant and his satires sting. Though called by contemporaries 'prince of lyrists,' he lacks a true lyric spirit. Rousseau's *Works* are in five volumes (Paris, 1820); the poetry, in one, edited by Manuel (ib., 1852); some *Contes inédits* were edited by Luzache (ib., 1881).

ROUSSEAU, JEAN JACQUES (1712-78). One of the greatest French writers of the eighteenth century. He was the son of a dancing master, Isaac Rousseau, a descendant of a French Huguenot, who had in the seventeenth century emigrated to Geneva in order to escape religious persecution. Jean Jacques never knew his mother, and was educated first by his father, who made him read mostly sentimental novels; then by an uncle and an aunt, M. and Mme. Bernard, who were a little higher than the Rousseaus in the social hierarchy of the Calvinistic city. Family troubles interrupted his education. Jean Jacques became an apprentice to an engraver, named Ducommun, by whom he was not well treated, and when sixteen years of age he left Geneva to try his fortunes in the adjoining Duchy of Savoy. This was Catholic, and its clergy constantly strove to make converts among the children of republican Switzerland. Rousseau was among these converts. His change of religion was effected at the 'Maison des Catéchumènes' of Turin, whither he had been sent on the advice of Madame de Warens, herself a convert, who was soon to exert a decisive influence upon his destiny. Jean Jacques was now for two years a servant in Madame de Vercellis's household, and he acted in a somewhat similar capacity in the Govone family. He also fell in with adventurers of a low type. This led to his return to Annecy, where Madame de Warens resided, and to his admission among her regular companions. She remained the ruling spirit of his life for about ten years, during which time he was several times engaged in more or less lucrative employments, especially in the office of the land survey of the Kingdom of Sardinia and in the choir of the Cathedral of Annecy. He left Madame de Warens several times, making trips to Fribourg, Lyons, Paris, and Montpellier. On his return from the last voyage he found things so changed in the house, especially owing to the arrival of a new comer named Wintzenried, that he decided he had better seek his fortunes unaided. The most profitable period of this part of Rousseau's life, as far as his education was concerned, was spent in a small country house not far from Chambery, whither Madame de Warens had removed from Annecy. In his *Confessions* he has left us a fascinating description both of the place, called *Les Charmettes*, and of the life he led there, which may be called his honeymoon with Madame de Warens. His intellectual powers and acquirements so developed there that he could a little later occupy the position of resident tutor in the

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family of the Grand Prieur de Mably, a brother of two distinguished writers of the time, the Abbé de Mably and the philosopher Condillac.

In 1741 Rousseau arrived in Paris, depending for his fortune upon a new and ingenious system of writing music. He laid his plan before the Royal Academy of Sciences, from which he received praise but no indorsement. Though baffled in his expectations, he had by the bringing forward of his musical investigations gained access to the most intellectual circles of Paris. He soon became a kind of secretary in the highly gifted family of Madame Dupin, the wife of one of the wealthy farmers-general, and her stepson, M. de Francueil, and shortly afterwards he was, through their influence, engaged in the same capacity by the Count de Montaigu, who had been appointed Minister of the King of France at Venice. For his new position the knowledge of Italian acquired by him in Turin gave Rousseau special fitness. His employer was wholly unable to understand his young secretary's mental superiority and to avoid inflicting upon him humiliating treatment. Rousseau left him, full of anger and indignation, and returned to Paris, where he expected to find justice for himself and punishment for his persecutor, but he soon discovered that for a man of the people to obtain redress for a wrong inflicted upon him by a member of the aristocracy was a thing not possible in France at that time. This was the first experience that led him to think of the system of social distinctions then in existence, and to examine whether any philosophical justification for them existed. He resumed his position near M. de Francueil and mingled more than ever with the world of artists, thinkers, and writers. He wrote for the stage, remodeled for the Court of Louis XV., with the consent of the author, Voltaire's dramatic cantata *La Princesse de Navarre*, which he renamed *Les fêtes de Ramire*, and took sides passionately in the conflict then raging in Paris between French and Italian music. He defended the latter in the first of his numerous polemical writings, the *Lettre sur la musique française* (1748). While in contact not only with refined society, but with thinkers like Diderot, D'Alembert, and Grimm, whom he considered in no way his superiors, Rousseau met Thérèse Levasseur, a young woman not above the condition of a servant, totally illiterate, according to Rousseau himself. Without marriage, he made her his permanent companion. Soon he was saddled not only with Thérèse herself, but with her father and mother and the rest of the family. If we may believe Rousseau's *Confessions*, he was fully conscious of the unworthiness of the surroundings thus created by him for himself. He is himself authority for the statement that Thérèse bore him several children, and that every one of these children was carried by him immediately after birth to the Home for Foundlings.

Rousseau was now on the eve of celebrity. In 1750 he published a short discourse in answer to the question propounded by the Academy of Dijon, whether the reëstablishment of sciences and arts had resulted in making morals purer. He answered negatively, but with such a force of eloquence and declamation that the Academy awarded him the prize, and the publication of his paper made him illustrious. An opera, of which he had written both words and music, *Le devin du village*, was performed with great applause first before the Court, at Fontainebleau, then at the Paris Opéra. More and more, however, he moved away from the bright Paris circles. He grew displeased with a social order in which he knew that he could not occupy a position in keeping with his mental superiority. This appeared when in 1754 he published his first important work, again an answer to a question propounded by the Academy of Dijon, as to the origin of inequality among men and whether it is justified by the law of nature. Of course again his answer was a negative one; but this time, although in style and argument the *Discours sur l'inégalité* is vastly superior to the *Discours sur les sciences et les arts*, the Academy dared not reward him with a prize. Before a society which was a curious blending of autocratic power and aristocratic privileges he had laid the claims of all men to an equal share not only in the government, but in the enjoyment of nature's blessings.

He was henceforth acknowledged a democrat, an advocate of the people. He would yield no more to aristocratic prejudices. He discarded the elegant dress of good society, ceased to act as secretary for members of the privileged classes, and announced that he would earn his living as a copyist of music. Ambition, however, had not forsaken him. His eyes turned toward his native State, to which he had dedicated his book. He visited Geneva, was welcomed with the highest honors, gave up Catholicism, and thus was allowed to resume his rights as a citizen; and when he left Geneva in order to return to Paris everybody understood that it was with the intention of soon coming back for good and competing for the municipal honors so dear to the heart of every citizen of the tiny Republic. Rousseau never returned to Geneva. Voltaire soon settled there himself, and Jean Jacques concluded that both could not live near each other in so small a place. His break with society was soon followed by similar treatment of his friends. Diderot and D'Alembert were then publishing their famous *Encyclopédie*, to which Rousseau had originally contributed articles on music, and also on political economy. But he had ceased to sympathize with a work the chief doctrine of which was that the happiness of mankind was bound up with the progress of enlightenment. He first simply moved away from Paris, not very far, to the Hermitage, a small house surrounded by woodlands on the estate of La Chevrette, which belonged to his friend, the wealthy and sprightly Madame d'Epinay (1756). But he soon quarreled with Grimm, Diderot, and Madame d'Epinay herself. In December, 1757, he left the Hermitage, where he had been Madame d'Epinay's guest, and moved to the village of Montmorency, near by. There he enjoyed the companionship, and to a certain extent the hospitality, of the Marshal Duke of Luxembourg.

Rousseau's masterpieces were written at the Hermitage and in Montmorency. After his *Letter on Providence*, addressed to Voltaire, in reply to the latter's poem on the Lisbon earthquake, he had written, as his declaration of war against not Voltaire alone, but all his old associates, the *Lettre à d'Alembert contre les spectacles*, in which he condemns the stage as a school of immorality. But these two comparatively slight works were shortly followed by *Julie, ou la nouvelle Héloïse* (1760); *Du contrat social*

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(1762); and his treatise on education, *Emile* (1762). These three works, so different from each other, coming from the same pen in such quick succession, raised him to the front rank of the literary men of his time, with only one left that could be considered his rival, Voltaire. *La nouvelle Héloïse* was mostly written at the Hermitage. Begun simply as an idealized record of his youthful memories, it was suddenly transformed by the ardent and unrewarded passion which he conceived for a sister-in-law of Madame d'Epinay—Madame d'Houdetot. The society of his time was purely intellectual and spurned all sentimentality. Rousseau pleaded for nature, for passion, for love with the energy of a heart ablaze with an overpowering passion. The success of the book, especially with the feminine public, brought about nothing short of a revolution in the manner of looking upon nature and society. Then came the *Contrat social*, which presented as the ideal and natural government the direct government of the people and which applied the name of sovereign, not to an hereditary monarch, but to the whole body of citizens. Finally, *Emile*, which must not be considered a formal treatise on education, but rather a string of interesting ideas and disquisitions on the subject, again said to the world: Trust to nature. All these teachings, helped by Rousseau's eloquent declamation, told upon society. Their climax was reached in a writing inserted in the fourth book of *Emile*, *La profession de foi du vicaire savoyard*, in which Rousseau puts into the mouth of a poor village priest a complete exposition of his system of natural religion.

Although M. de Malesherbes, the public official in charge of the supervision of new books, had read and approved of *Emile*, the Parliament of Paris condemned it and ordered the arrest of the author. Rousseau took refuge at Yverdun, a village belonging to the Republic of Bern. Bern ordered him out of the territory of the Republic. Geneva acted in the same manner and condemned both *Emile* and the *Contrat social*. At last Rousseau found a refuge in the County of Neuchâtel, then belonging to the King of Prussia, and governed in his name by Marshal Keith. There, in the village of Môtiers-Travers, Rousseau spent three peaceful years (1762-65), during which he wrote the letter to Christophe de Beaumont, Archbishop of Paris, by whom he had been openly censured, and the eloquent *Lettres de la montagne*, in which he answered the jurist Tronchin of Geneva, another of his critics.

Another storm came, real perhaps, perhaps only stirred up by Thérèse, who wished to get away from Môtiers-Travers. Stones were thrown against Rousseau's house. He believed his life in danger. He was then a prey to the idea that the whole of the world was making dark plots against him. After another vain attempt to settle within the boundaries of the Republic of Bern, in the island of Saint Pierre, on the Lake of Bienne, he returned to France, and, on the invitation of Hume, he crossed to England. His sojourn there is unimportant in the history of his life, save that it is marked by his wanton quarrel with Hume, and by his writing there a large part of his *Confessions*. In 1767 he left England, wandered then for a few years mostly in the south of France, going from one friend's residence to another, and finally in 1770 returned to Paris and settled unmolested in his old home, in the Rue Plâtrière, now Rue Jean Jacques Rousseau, where he spent the last years of his life in comparative peace. He died July 2, 1778, after a four weeks' stay in the Château of Ermenonville, a few miles from Paris, belonging to the Marquis de Girardin. Some ascribed his death to suicide, but the idea is not entertained to-day.

His last works, the *Dialogues*, or *Rousseau juge de Jean Jacques*, and the *Rêveries du promeneur solitaire*, show, one the climax of, and the other the relief from, the mental aberration created in him both by his supersensitive subjectiveness and by the real persecutions that assailed him. There is no good complete edition of Rousseau's works. The best was published at Paris in 1823-26 by Musset-Pathay, in 23 volumes, but it must be supplemented by a number of later publications, never included in the so-called complete editions, notably by the *Œuvres et correspondances inédites* (2 vols.) published at Paris in 1861 by Streckeisen-Moulton.

BIBLIOGRAPHY. The best English work on Rousseau is John Morley's *Rousseau* (London, 1873). The best short work in French is the monograph of Arthur Chuquet in the *Collection des grands écrivains français* (Paris, 1893). Consult also the biographies by Brockerhoff (Leipzig, 1863-74), Vogt (Vienna, 1870), Saint-Marc Girardin (Paris, 1875), Graham (Edinburgh, 1882), Gehrig (Neuwied, 1889), Mahrenholtz (Leipzig, 1889), and Beaudouin (Paris, 1892); moreover: Streckeisen-Moulton, *Rousseau, ses amis et ses ennemis* (ib., 1875); Desnoiresterres, *Voltaire et la société française*, vol. ii. (ib., 1875); Borgeaud, *Rousseaus Religionsphilosophie* (Leipzig, 1883); Jansen, *Rousseau als Musiker* (Berlin, 1884); *Maugras, Querelles des philosophes* (Paris, 1886); Faguet, *XVIIIème siècle* (ib., 1890); Grand-Carteret, *Rousseau jugé par les français d'aujourd'hui* (ib., 1890); Mugnier, *Madame de Warens et Jean Jacques Rousseau* (ib., 1890); Texte, *Jean Jacques Rousseau et les origines du cosmopolitisme littéraire* (ib., 1895); Léo Claretie, *Rousseau et ses amies* (ib., 1896); Höffding, *Rousseau und seine Philosophie* (Stuttgart, 1897); Lincoln, *Rousseau and the French Revolution* (Philadelphia, 1897); and for a criticism especially of his educational theories, Schneider, *Rousseau und Pestalozzi* (2d ed., Berlin, 1881); Davidson, *Rousseau and Education According to Nature* (New York, 1898).

ROUSSEAU, LOVELL HARRISON (1818-69). An American soldier, born in Stanford, Lincoln County, Ky. He studied law at Louisville, removed to Bloomfield, Ind., and was admitted to the Indiana bar in 1841. He fought in the Mexican War as a captain in the Second Indiana Regiment, and distinguished himself at Buena Vista. On his return from the war he was elected to the Indiana Senate, but two years later left the State and settled in Louisville, Ky. Upon the breaking out of the Civil War he endeavored to keep Kentucky in the Union, and in 1860 he raised the Fifth Kentucky Regiment, of which he was made colonel. He was promoted to the rank of brigadier-general in 1861, served with great credit in the second day's battle at Shiloh, and for gallant conduct at Perryville was made a major-general of volunteers. Later he commanded the Fifth Division of the Army of the Cumberland at Stone River and at Chickamauga; in 1864 made a destructive raid into Alabama,

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and had command of Fort Rosecrans under General Thomas in the Nashville campaign. After the war he became a member of the National House of Representatives, and while serving in this capacity he made an assault upon Josiah B. Grinnell of Iowa, was censured by the House, and resigned, but was reëlected during the following recess. In 1867 he was made a brigadier-general in the Regular Army, and was sent to Alaska, where he received the formal transfer of that Territory from Russia. At the time of his death in 1869 he was commander of the Department of the Gulf.

ROUSSEAU, PHILIPPE (1816-87). A French painter. He was born in Paris in 1816, and was a pupil of Gros and Victor Bertin. He began as a landscape painter, but later painted chiefly animals, fruits, and flowers, ranking with Chardin and Decamps in depicting monkeys. His painting held the qualities of the Dutch School and was deep, broad, and harmonious in color. Ivory work, metal or porcelain bowls of glowing fruit, he displayed to perfection against a background of exquisite tone. Among his works are: "Storks Taking a Siesta," "The Monkey Photograph," "Le rat de ville et le rat des champs," etc.

ROUSSEAU, THÉODORE (1812-67). A French landscape painter, of the Barbison School, born at Paris, April 15, 1812, the son of a well-to-do bourgeois tradesman. He was the brother of Philippe Rousseau. At the age of fourteen he produced "The Signal Station," which secured for him permission to devote himself to art. He studied under Remond and Lethière. As a pupil of the Ecole des Beaux-Arts he revolted against the prevailing classicism, and though competing for the Prix de Rome in 1831, he produced, instead of the historical landscape set for a subject, a "Site d'Auvergne," that failed of the prize but determined his own independent course. In 1834 he received a third-class medal for "Les Côtes de Grandville," but when he next essayed the Salon with his "Descente des Vaches," he found himself, along with Decamps, Delacroix, Champmartin, and other Romanticists, shut out from exhibition. Academic hostility lasted until the reform of the Salon jury in 1848, and the consequence to Rousseau was a bitterness of spirit hardly appeased by his later honors. At the Exposition Universelle in 1867 he was made president of the French jury, and received the grand medal of honor by the votes of all the juries of the various nations. His later life was passed at Barbison, where he built his home in 1848. He was a recluse from society, married to a peasant woman who became stricken with insanity and whom he tenderly cared for. On December 20, 1867, he succumbed to paralysis, attended to the last by the painter Millet, his most intimate friend. A distinguishing characteristic of Rousseau's art is the remarkable balance of intellectual and emotional qualities. He has well been called the epic poet of landscape art. He chose the most solid features of the landscape, the vigor of oak and beech tree, the structural emplacement of rock and hills, the serene placidity of water and plain. Always a good and careful draughtsman, his early pictures show almost an over-insistence on details; the eye is carried back into remote reaches of distance, from point to point of subtly developed planes. But he never sacrificed breadth and harmony of color.

In 1833 Rousseau took up his abode at Barbison and spent his life mainly in painting scenes of the forest. He visited Brittany in 1837 and painted his "Avenue of Chestnuts;" he also painted in the Ile-de-France, and in Berry and Gascony, but no characteristic feature of the forest of Fontainebleau escaped his eye and brush. Many of Rousseau's masterpieces are owned by private collectors in America. His principal works include: "Landscape After a Rain;" "Edge of the Forest of Fontainebleau" (1852, Louvre); "Hoar Frost," in the Walters Collection, Baltimore, and "Fens in the Landes" (1854, Louvre); "The Gorges of Apremont" (1859, in the Vanderbilt collection, New York); "Le chêne de roche" (1861); "Road in the Forest," and "Setting Sun" (1866), both in the Louvre. Consult: Sensier, *Souvenir sur Théodore Rousseau* (Paris, 1872); Gensel, *Millet und Rousseau* (Bielefeld, 1902); Muther, *History of Modern Painting* (London, 1896); Coffin, in Van Dyke, *Modern French Masters* (New York, 1896).

ROUSSEL, rōō'sĕl', GÉRARD (c.1480-1550). A French reformer, born near Amiens. He was an intimate friend of Lefèvre d'Estaples (see FABER), and, like him, embraced the Reformation and boldly defended it, with the view that he could do so without separating himself from the Catholic Church. He taught in the college of Cardinal Le Moine, in Paris, but in 1521 his religious views brought him under disfavor, and he went to Bishop Breçonnet, at Meaux, another of the open sympathizers with the Reformation. But persecution followed him and he went to Strassburg (1525). The next year the Queen of Navarre, Marguerite d'Angoulême, made him her confessor, and under her powerful protection and patronage he lived securely. She had him appointed to the Bishopric of Oléron (1536). Early in 1550, while preaching at Mauléon against the excessive number of ecclesiastical festivals, he was set upon by a fanatic and fatally injured. Consult his *Life* by Charles Schmidt (Strassburg, 1845) and the letters and notes given by Hermingard, *Correspondance des réformés* (2d ed., Paris, 1878).

ROUSSET, rōō'sā', CAMILLE FÉLIX MICHEL (1821-92). A French historian, born in Paris. He became professor of history at Grenoble in 1843, and from 1845 to 1863 held the chair of history at the Collège Bourbon in Paris. In 1864 he was appointed historiographer and librarian to the Minister of War, a post which he held until 1876. He was elected to the French Academy on December 30, 1871. Among his works the following deserve mention: *Précis d'histoire de la Révolution française* (1849); *Histoire de Louvois et de son administration politique et militaire* (1861-63); *Les volontaires de 1791-94* (1870); *Histoire de la guerre de Crimée* (1877); *La conquête d'Alger* (1879); *Les commencements d'une conquête* (1887).

ROUSSILLON, rōō'sē'yŏn'. Formerly, a province of Southern France, lying between Languedoc, Foix, the Pyrenees, and the Mediterranean; now comprised within the Department of Pyrénées-Orientales. (See, under FRANCE, map showing former French provinces.) Its capital was Perpignan (q.v.). Its ancient inhabitants were the Cardones, whose capital, Ruscino, gave

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the country its name. From the Romans, the region passed, about 460, to the Visigoths and in 720 it was conquered by the Arabs. The Franks conquered it in 759. Under the Carolingians it was ruled by counts who, about 900, succeeded in establishing their independence. In 1172 Roussillon was acquired by Aragon, and in 1642 it was wrested from Spain by Louis XIII. of France. It was definitely ceded to France by the Peace of the Pyrenees (1659).

ROUTH, routh, EDWARD JOHN (1831—). An English mathematician, born in Quebec, Canada, and educated at University College, London, and at Peterhouse, Cambridge. He received high honors in London and Cambridge, and was a well-known tutor from 1855 to 1888. Routh was long examiner in Cambridge and London universities; was fellow of Peterhouse (1857-64); was elected to the Astronomical Society in 1866 and to the Royal Society in 1872. He published a *Treatise on Rigid Dynamics*, which went through six editions and was translated into German; a *Treatise on Analytic Statics* (1891-92); and *Dynamics of a Particle* (1898).

ROUTH, MARTIN JOSEPH (1755-1854). An English scholar and educator, born in South Elmham, Suffolk, and educated at Queen's and Magdalen colleges, Oxford. At Magdalen he became fellow in 1775, librarian in 1781, and senior proctor in 1784. Elected president of the college in 1791, he held that post for sixty-three years. Routh lived into his one hundredth year with no impairment of his mind and little of his bodily strength. He was a thorough scholar, an especial authority on ecclesiastical law and history, and an intimate friend of Porson. Routh's library became the property of Durham University. He published editions of Plato's *Euthydemus* and *Gorgias* (1784), *Reliquiæ Sacræ Secundi Tertiique Sæculi post Christum* (1814-18), Burnet's *History* (1823) and *History of the Reign of James II.* (1852), *Scriptorum Ecclesiasticorum Opuscula quædam* (1832), and *Tres breves Tractatus* (1853). Consult the sketch in Burgon's *Lives of Twelve Good Men* (London, 2d ed., 1888).

ROUTHIER, rōō'tyâ', ADOLF BASILE (1839—). A Canadian jurist, born at Saint Placide, Province of Quebec. He graduated in 1858 at Laval University, Quebec, was admitted to the bar in 1861, practiced at Kamouraska, and in 1873 he became a puisne judge of the Superior Court of Quebec Province. In 1897 he was appointed judge of the Vice-Admiralty Court of Quebec. He was also professor of international law in the Laval University, and a fellow of the Royal Society of Canada. Previous to his appearance on the bench he was active as a journalist, and he published several volumes, including *A travers l'Europe* (1882-83), his most important work: *Les échos* (1883), a collection of verse; and *Conférences et discours* (1890).

ROUTLEDGE, rūt'lĕj, GEORGE (1812-88). The founder of the London publishing firm now styled George Routledge & Sons. He was born at Brampton, in Cumberland. After serving his apprenticeship with a bookseller at Carlisle, he went to London (1833), and in the course of three years he opened a retail shop of his own (1836). In 1843 he began publishing. Routledge was a pioneer in publishing cheap books, especially of American authors, for the masses. Among his successful ventures are *The Railway Library* (1848 et seq.), leading off with Cooper and numbering over a thousand volumes; *Routledge's Universal Library*, edited by Henry Morley (60 vols., 1883 et seq.); and editions of Irving, Cooper, Ainsworth, Bulwer, etc. Of *Uncle Tom's Cabin* he sold 500,000.

ROUVIER, rōō'vyâ', MAURICE (1842—). A French politician, born at Aix. He studied law, and became an advocate at Marseilles. In politics he was a Republican; he attacked the Empire in opposition journals, and in the National Assembly, to which he was first elected in 1871, he was identified with the Extreme Left. In 1881-82, during the Premiership of Gambetta, he was Minister of Commerce and the Colonies, and he held the portfolio of Commerce also in 1884-85, in the Ferry Cabinet. From May to December, 1887, he was at the head of a Cabinet in which he also was Minister of Finance. He received the portfolio of Finance (1889) in the Tirard Ministry, and retained it during the successive Ministries of Freycinet, Loubet, and Ribot, until he withdrew from it in 1892 in consequence of his implication in the Panama affair. In 1902 he became once more Minister of Finance, in the Combes Cabinet.

ROUX, rōō, PIERRE PAUL EMILE (1853—). A French physician and bacteriologist, born at Confolens (Charente). He studied medicine at Clermont-Ferrand (Puy de Dôme), and at Paris, where from 1874 to 1878 he held a subordinate post in the Faculty of Science. In 1878 he entered the laboratory of Pasteur, in 1883 became adjunct assistant director, and in 1896 assistant director of the Pasteur Institute. He assisted Pasteur in various experiments, including those concerning the ætiology of carbon and the preventive treatment of hydrophobia. He also did some work in the development of Behring's diphtheria toxin treatment. Of his other researches may be mentioned those conducted with Nocard regarding pneumonia, among the results of which was the discovery of the pneumonia microbe.

ROUX, WILHELM (1850—). A German physiologist and anatomist, born at Jena. He studied at Jena, Berlin, and Strassburg universities, in 1879 was appointed an assistant in the Hygienic Institute at Leipzig, afterwards became a lecturer at Breslau, and in 1886 professor there. In 1889 he was called to the chair of anatomy at Innsbruck, and in 1895 received a similar appointment at Halle. His particular researches were in connection with the science of 'Entwicklungsmechanik'—the influence upon physical development of the mechanical demands made upon various organs. Roux published in exposition of this theory *Die Entwickelungsmechanik der Organismen* (1890), and other works.

ROVE BEETLE. Any representative of the Staphylinidæ, one of the largest families of beetles. The body is long and slender, while the wings are very short, well developed, and when not in use are folded under the short wing-covers. The abdomen is soft and flexible, and these insects have a habit of turning up the point of it, particularly when annoyed, whence the English name 'cocktail.' Their food is carrion of different kinds, and some will feed upon living insects as well as dead ones, and probably on

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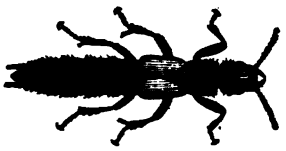
fungi. Many of them have a fetid odor. About 9000 species have been described, 1000 of which occur in North America. A very large and pow-



A ROVE BEETLE.

erful species lives in the nests of wasps and hornets. Other species live in the nests of termites.

ROVEREDO, rō've-rā'dō (Ger. *Rofreit*). A town in South Tyrol, Austria, picturesquely situated on the Leno, 15 miles by rail south-southwest of Trent (Map: Austria, B 4). Roveredo is the centre of the Tyrolese silk trade. It manufactures leather, paper goods, and strings for musical instruments, and trades in wines, cereals, hams, and fruits. Near by is a castle where Dante sojourned. Roveredo belonged to Venice in the fifteenth century. Population, in 1900, 10,180, mostly Italians.

ROVIGNO, rō-vē'nyō (Lat. *Arupenum, Rubinum*). A seaport in the Crownland of Istria, Austria, situated on a rocky promontory in the Adriatic, 40 miles south of Triest (Map: Austria, C 4). Rovigno is famous for its wine, hazel-nuts, and olive oil. There are ship-building yards, a large tobacco factory, and tunny and sardine fisheries. The inhabitants are famous as pilots. Population, in 1900, 10,205, mostly Italians.

ROVIGO, rō-vē'gō. The capital of the Province of Rovigo, Italy, situated on the Adigetto, 38 miles southwest of Venice (Map: Italy, F 2). Its ancient walls and towers and the ruins of an old castle are still to be seen. There are a town hall with a picture gallery and a library of 80,000 volumes, a gymnasium, a lyceum, and a technical school. In the Middle Ages Rovigo belonged to Venice. Population (commune), in 1901, 11,174.

ROVIGO, DUKE OF. See SAVARY.

ROVING. See SPINNING.

ROVNO, rōv'nō. A town in the Government of Volhynia, Russia, situated on two important railway lines, 115 miles west-northwest of Zhitomir. It has some flour mills, and trades in grain, cattle, and wood. It belongs to the counts of Lubomirski. Population, in 1897, 24,905, mostly Jews.

ROVUMA, rō-vōō'mä. A river of East Central Africa, forming the boundary between German and Portuguese East Africa (Map: Congo Free State, G 5). It rises on the Livingstone Mountains, which extend along the east shore of Lake Nyassa, and flows eastward into the Indian Ocean. Its length is about 400 miles. About half way to its source it receives the Lujenda, a rapid and shallow stream. Below the confluence the Rovuma is navigable during the wet season for river craft of considerable size. The river was first explored in 1861 by Livingstone.

ROWAN, rō'an, STEPHEN CLEGG (1808-90). A distinguished American naval officer. He was born near Dublin, Ireland, but emigrated to America with his parents at an early age and settled in Ohio. In 1826 he was appointed midshipman in the navy. In the Mexican War, as executive officer of the *Cyane*, he assisted in the capture of Monterey and San Diego and in the attack on Guyamas. He also commanded the naval battalion under Commodore Stockton at the battle of Mesa in Upper California, and later helped to surprise a Mexican outpost near the town of Mazatlan. The outbreak of the Civil War found him in command of the *Pawnee*. With that vessel he protected Washington for a time and covered the Federal force in Alexandria, and on May 25, 1861, engaged a Confederate battery at Acquia Creek, thus fighting the first naval action of the war. Later he took part in the *Pawnee* in the capture of the forts about Hatteras Inlet, participated in the expedition under Goldsborough in January, 1862, and in the following month assisted in the capture of Roanoke Island. On February 10th, as commander of the *Delaware* and a flotilla of other vessels, he pursued the Confederate fleet into Pasquotank River, captured it, and destroyed the fortifications on shore. Following up this success, he passed on up the river, seized Elizabeth City and Edenton, captured and destroyed several armed vessels, and then obstructed the Chesapeake and Albemarle Canal. In March, 1862, he coöperated with General Burnside in the capture of Winston, Newbern, and Beaufort. For his services Rowan received the thanks of Congress, and was promoted first to be captain, and afterwards to be commodore. He was in command of the *New Ironsides* off Charleston, and in the absence of Admiral Dahlgren was in command of the entire blockading squadron. In 1866 he was made a rear-admiral, and in 1870 was advanced to the rank of vice-admiral. He retired in 1889. Consult an article by Admiral Stevens in Hamersly's *Naval Encyclopedia* (Philadelphia, 1881 and 1884); Johnson and Buel (eds.), *Battles and Leaders of the Civil War* (New York, 1887).

ROWAN-TREE (*Pyrus Aucuparia*). A small tree of the natural order Rosaceæ, often planted for its graceful pinnate foliage, corymbs of small whitish flowers, and bright-red berries. See MOUNTAIN ASH.

ROWE, NICHOLAS (1674-1718). An English dramatist and poet laureate, born at Little Barford, Bedfordshire. He was educated at Westminster, and studied law in the Middle Temple, but devoted himself to literature. Between 1700 and 1715 he brought forth eight plays, of which three were long popular: *Tamerlane* (1702), *The Fair Penitent* (1703), and *Jane Shore* (1714). The character of Lothario in *The Fair Pentitent* is the prototype of Lovelace in Richardson's *Clarissa Harlowe*. Perhaps Rowe is now best known for his critical edition of Shakespeare (6 vols., 1709; revised, 8 vols., 1714), really the first critical edition. His popular talents and engaging manners procured him many friends and several lucrative offices. The Duke of Queensberry made him Under-Secretary of State. In 1715 he succeeded Tate as poet laureate. He died December 6, 1718, and was buried in Westminster Abbey. After his death appeared his complete verse translation of Lucan's *Pharsalia*.

ROWENA, rō-ē'nä. In Scott's *Ivanhoe*, the ward of Cedric the Saxon, and the successful rival of Rebecca for Ivanhoe's love.

ROWING (from *row*, AS. *rōwan*, Icel. *rōa*, to row; connected with OIr. *rāme*, Lat. *remus*, Gk.

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ἐρετμόν, *eretmon*, oar, Skt. *aritra*, rudder, paddle, *ar*, to drive, push, OChurch Slav. *rěyati*, to push, and ultimately with Eng. *rudder*, oar). The art of propelling a boat by means of oars. Professional boating is almost exclusively single sculling, which method will be found treated separately. This article is, therefore, confined to fresh-water rowing in competitive races, by crews mostly of eight men, though occasionally of four, and more rarely of two.

The boats are light, long, and narrow. The English custom in an eight-crew boat is to seat each man as far over to the opposite side from his rowlock as possible, so that, in effect, four sit on one side and four on the other. In America, the men sit in a straight line down the centre of the boat. In eights, the boat is kept in its course by a steersman (coxswain), sitting in the stern and guiding it with tiller ropes attached to the rudder. In fours, however, it is usual to dispense with a steerer, the first rower from the stern keeping the boat in the desired position by pressing a board with his feet to which the rudder lines are attached. Pairs dispense with a rudder altogether. The styles of rowing differ with place and period, and each has stanch advocates. But there is one fundamental principle governing the whole subject: what the oar does in the water is the only thing that gives pace to a boat. *The swing forward* is to put the oar, held horizontally so as to minimize the resistance of the atmosphere, back beyond the rowlock, so that, when turned on edge it may drop into the water at the most effectual spot. *The beginning* is the applying the whole weight of the body against the water in front of the blade. *The swing back* carries the blade onward. *The finish* is when the body has passed the perpendicular, and *the recovery* is when the oar is lifted out of the water by the rower lowering his hands, when the swing forward for another stroke begins.

The boats have had an interesting development in the aim to combine lightness and strength. In the early days they were heavy, wide, and deep, with a keel and with rowlocks or ruts for the oars on their sides. The first decided innovation was that of Clasper, a celebrated Oxford builder, who in 1844 designed light iron brackets extending out from the sides of the boat. These enabled the rowlock to be at a point farther out than before from the rower's hand, and thereby increased the power of his stroke. They were adopted both in England and by Yale and Harvard. The next improvement was in 1856, when the first keelless boat was built by Taylor. This was a revolution necessitating a new method of rowing; in fact, modern rowing styles all date from that event. The sliding seat, introduced by Yale in 1870, was the next, and remains practically the last of the steps in the evolution of the design of the rowing boat. It made rowing much more pleasant and necessitated the use of a longer leverage of the oar inboard, but it did not require any material alterations in methods of rowing. It was quickly improved, and by 1872 was in general use in England as well as in America. The boat of a racing eight is approximately 60 feet long, two feet wide, and one foot deep. The slide varies in length, as does the distance of the rowlock from the centre of the seat. Thirty inches is the average distance in England where fixed rowlocks are used. In America the rowlocks work on a swivel. The material of the boat in Great Britain has nearly uniformly been cedar, and this wood is much used in the United States, although papier-maché and aluminum have been tried with more or less success under suitable conditions. Expert boat-builders, however, seem to prefer cedar. The oars of America are lighter and of a different shape from those in use in England, and wider, ranging from 6½ to 7¼ inches across the blade. The standard English length is 12 feet 6 inches over all, buttoned for the rowlock at 3 feet 8 inches from the handle end, and 5½ inches wide in the blade, although the oar must be accommodated to the individual oarsman.

In all probability, competitive rowing owes its origin to the Thames watermen. The Windsor watermen of the royal barge and their aquatic contests would naturally interest the Eton boys directly across the Thames, so that it is not surprising to find the earliest instance of a rowing club at Eton. Its list of captains is complete from the year 1812, although its operations extend back into the previous century. Since then Eton has been the nursery of the best oarsmen of both the ancient English universities. The rowing history of Oxford does not go further back than 1815, when Brasenose was at 'the head of the river,' a term that necessarily implies earlier struggles, the records of which are lost. Cambridge has no authentic racing data earlier than 1825. There, too, for many years every college has had one, two, or three rowing clubs. The first English club not located at a public school or university was the Leander Boat Club, on the Thames, which was incorporated in 1812 for the purpose of keeping together 'old blues' of both universities who were resident in London. Its membership is limited to men who have actually rowed in the Oxford and Cambridge crews, or in the trial eights from which the crews were selected. Its influence on rowing has been of the first importance, and today its crews hold the premier honors of the rowing world. The Australian Rowing Association, founded in 1879, is the governing body for general rowing in Australia.

Rowing in the United States. American boating has been greatly advanced by the colleges, whose crews represent on the whole the most finished watermanship, and hold nearly all the records for the distances and conditions in which they compete. These contests between colleges represent, also, clean and well-conducted sport. Rowing began in the United States early in the nineteenth century, and the first important race was held in 1811, when a New York City crew, rowing in a four-oared barge, defeated a Long Island crew. The oldest boat club in the country is the Detroit Boat Club, founded in 1839. In 1843 the second, and existing club, was formed at Yale. Rowing at Harvard had been organized as early as 1839. Serious boat racing began with intercollegiate boating, nine years after the formation of the Yale Boat Club, and its history ever since has been intimately connected with collegiate athletics. The first intercollegiate regatta was held in 1852, Yale and Harvard then being the only boating colleges. Harvard won the race, and also a second one, which was held in 1855. In 1858, at the suggestion of Harvard, the Union College Regatta Association was formed, com-

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posed of Harvard, Yale, Trinity, and Brown. Harvard won all the races of this association, which dissolved upon the breaking out of the Civil War. There were no races during the early years of the war, but in 1864-70 Yale and Harvard met in six-oared barge races, and Harvard won five of the seven contests. In 1871 the famous Rowing Association of American Colleges was formed, having at one period sixteen members. In the six annual regattas held by this association, the Massachusetts Agricultural College, Amherst, Yale, and Columbia won in the four-oared races. Cornell won the last two. Yale refused to row in 1876, and competed instead with Harvard in a dual race, the first in the Harvard-Yale series in eights for four miles. Harvard competed in both races that year, but it was the last regatta held by the Intercollegiate Association, which then ceased to exist.

With Harvard and Yale rowing together, a few of the remaining colleges competed in various combinations until 1883, when for the third time an intercollegiate association was formed by Bowdoin, Columbia, Cornell, Princeton, Rutgers, University of Pennsylvania, and Wesleyan, rowing in four-oared shells over a 1½-mile course. In 1883, also, Cornell and Pennsylvania met for the first time, and have competed annually ever since, either in dual races or at the larger regattas. After 1887 rowing ceased at most of the colleges, in addition to Harvard and Yale, the races of 1888-94 being between Cornell, Columbia, and Pennsylvania only. In 1895 the present Intercollegiate Association was formed by these three colleges, with whom the management rests. The regatta is open to all college crews. The entrance of Harvard in the regatta of 1896 is connected with one of the most notable chapters in intercollegiate rowing history. In 1896-97 Cornell and Harvard had a dual agreement in athletics. Harvard had dropped all relations with Yale, owing to a serious athletic rupture, and while Yale rowed at Henley (England), Harvard competed in the Poughkeepsie races. In the following year, 1897, Harvard resumed relations with Yale, and as she had an engagement to meet Cornell and did not wish to row two races, suggested that Yale be admitted to the Harvard-Cornell race. Cornell agreed, but suggested in turn that Columbia and Pennsylvania be also admitted. This Yale refused to consider, on the grounds that the race would be unwieldy. Cornell was unwilling to forsake Pennsylvania and Columbia. At the same time she was anxious to compete with the New Haven university, whom she had not met on the water since 1875, except in a freshman race in 1890. As a result Cornell rowed in two regattas in 1897 and again in 1898, defeating Yale and Harvard both times. In the latter year, however, the races were rowed in different places, within a week of one another, and Cornell in the intercollegiate regatta lost to Pennsylvania. This was her first serious defeat, with one exception, in 14 years. In 1899 Cornell declined the invitation of Harvard and Yale to row in their dual race, but expressed herself as willing to meet them as competitors in the Intercollegiate Regatta. The victory of Pennsylvania in 1898 proved a turning point in Pennsylvania's career, and her 'varsity crews won both in 1899 and 1900. It has been the aim of the Intercollegiate Association to make its regatta a representative meeting of American boating colleges. A four-oared 'varsity race was added in 1899 to the regular 'varsity and freshman events in eights, and in 1900 pair-oared and single events were provided for in case of three entries in each race.

The formation of the American Association of Amateur Oarsmen in 1871, as the governing rowing association of the United States, was the first satisfactory step toward the enforcement, outside of the colleges, of amateur rowing, although an amateur standard had been recognized in a way some thirty years before, when the Castle Garden Boat Club Association was formed. The association has held annual regattas at various places, with singles, doubles, pair-oared, four-oared, and eight-oared events. In 1900 at New York the winners of special races were sent to compete in the international races at the Paris Exposition. Besides the national body there are fifteen organizations of rowing clubs representing the various sections of the country, each of which holds its annual regatta, and many of which enter even in the national races. In Canada an association of amateur oarsmen was formed in 1870 and has since held annual championship regattas.

There have been several international rowing contests, of which the following is a summary: 1869—Harvard 'varsity four against Oxford, over the Thames course, lost by six seconds. 1876—London Rowing Club on the Schuylkill River course at the United States Centennial Regatta were defeated. 1881—Cornell 'varsity four lost at Henley. 1878—Columbia 'varsity four won the Visitors' Cup at Henley Regatta. 1882—The Hillsdale crew rowed against the Thames Rowing Club and lost by reason of the bow oarsman breaking his oar. 1895—Cornell 'varsity eight entered for the Grand Challenge Cup at Henley defeated by Trinity Hall, Cambridge. 1896—Yale 'varsity eight entered for Grand Challenge Cup at Henley, defeated by Leander Boat Club. 1901—University of Pennsylvania eight entered for the Grand Challenge Cup at Henley, won the first heat over London Rowing Club, the second heat over Thames Rowing Club, but lost the final heat to the Leander club by one length.

Consult: Breckwood, *Boat Racing* (London, (1876); Woodgate, *Oars and Sculls* (New York, 1874); *Boating*, in Badminton Library (London and New York); Lehman, *Boating*, in Isthmian Library (London, 1897); Whitney, *A Sporty Pilgrimage* (New York, 1895); "Rowing," in *Encyclopædia of Sport* (ib., 1898).

ROWLAND, rō'land, Henry Augustus (1848-1901). An American physicist, born at Honesdale, Pa. He studied civil engineering at Rensselaer Polytechnic Institute, Troy, where he graduated in 1870. He became instructor at Wooster University, Ohio, and then instructor and afterwards assistant professor at Rensselaer Institute. He became (1876) professor of physics at Johns Hopkins University, a chair he occupied at the time of his death. Professor Rowland was one of the greatest physicists of the nineteenth century and had an international reputation. His determination of the mechanical equivalent of heat was one of his most important investigations. His determination of the ohm was likewise of great value; and his study of the magnetic proper-

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ties of iron led to entirely new conceptions of magnetism. His interest in spectroscopy led him to the discovery of the principle of the concave grating, and to the construction of a dividing engine provided with a screw of extreme accuracy and uniformity of pitch, by which gratings were prepared under his direction. Rowland not only made an eye study of the spectrum, but also applied photographic methods. He investigated the solar spectrum and the arc spectra of various elements, and carried on many researches in allied fields. His work on alternating currents and their application has also been of importance. One of his last investigations resulted in the development of a system of multiplex telegraphy based on the use of synchronous motors, for which he received a gold medal from the Paris Exhibition. Perhaps his most important discovery was that of the magnetic effect of electric convection, which has a wide-spread theoretical bearing upon electrical phenomena. At the time of his death Professor Rowland was the president of the American Physical Society, of which he was one of the founders. Some of his important researches are the following: *On Magnetic Permeability* (1873); *On the Magnetic Permeability and Maximum Magnetization of Nickel and Cobalt* (1874); *Studies on Magnetic Distribution* (1875); *On a Magnetic Effect of Electric Connection* (1876); *Research on the Absolute Unit of Electrical Resistance* (1878); *On the Mechanical Equivalent of Heat* (1880); *On Concave Gratings for Optical Purposes* (1883); and *On the Relative Wave Lengths at the Lines of the Solar Spectrum* (1886). His collected physical papers were published by the Johns Hopkins Press, 1902. To this collection there is prefixed a biographical sketch by Professor T. C. Mendenhall.

ROWLANDS, rō'landz, SAMUEL (c.1570-?). An English author, who published about twenty-five famous pamphlets in prose and verse. Some are on religious themes, but most are satires on contemporary manners. The series began with *The Betraying of Christ*, a poem (1598), and closed with *Heaven's Glory. Seeke it. Earth's Vanitie. Flye it. Helle's Horrour. Fere it* (in verse and prose, 1628). Of his satirical work, a good specimen is *The Letting of Humours Blood in the Head-Vaine* (1600), a collection of satires and epigrams, assailing his contemporaries under fictitious names. To the same year belongs the similar *A Mery Metinge, or 'tis Mery when Knaves mete.* Both these pamphlets were burned by the authorities, and the publishers were fined for handling them. *Martin Mark-all, Beadle of Bridewell* (1610), is an excellent account of the rogues of the time. Consult the reprint of his *Works*, with an introduction by Gosse (Hunterian Club, Glasgow, 1872-1886). The introduction was reissued in Gosse's *Seventeenth Century Studies* (London, 1883).

ROWLANDSON, rō'land-son, MARY. An English colonist of the seventeenth century, famous for one book. Her husband was Joseph Rowlandson, the first minister of Lancaster, Mass. On February 10, 1675, Lancaster was destroyed by the Indians, who carried off Mrs. Rowlandson and her children. After her release three months later appeared her book, called *A True History of the Captivity and Restoration of Mrs. Rowlandson, a Minister's Wife in New England, Whereunto is Annexed a Sermon by Joseph Rowlandson, her Husband.* She tells of her sufferings by cold and hunger, of her child's death by cold, and of her sale by her Narraganset captor to an Indian chief. She was at last ransomed for about $80, a sum raised by several women of Boston. Her book went through various editions.

ROWLANDSON, THOMAS (1756-1827). An English artist and caricaturist, born in Old Jewry, London. He early displayed skill in caricature, was a student at the Royal Academy, and afterwards at a drawing-school in Paris, and set up in London as a portrait-artist. In 1777-81 he also exhibited landscapes and portraits with much success at the Royal Academy. In 1781 or thereabouts he assumed to greater extent the manner of caricature. He was known for his representations of Napoleon, but more particularly for his series, including the "Tours of Dr. Syntax" (1812, 1820, 1821), "The English Dance of Death" (1815-16), and "The Dance of Life" (1816), all with text by William Combe. His work was chiefly in pen-and-ink, lightly washed or retouched in water-colors. His humorous quality included the picturesque, for example in posting and driving scenes at the inn or on the highroad. In attempts along other lines he was unmistakably inferior. It has been frequently asserted that his technical merits and originality might well have entitled him to occupy a more serious place in the history of English art. Consult: Wright, *History of Caricature and the Grotesque in Art* (London, 1845); and Grego, *Rowlandson the Caricaturist* (ib., 1880), with a detailed enumeration of the artist's works.

ROWLEY, rou'lĭ, WILLIAM (c.1585-c.1642). An English actor and dramatist about whom very little is known. He was connected with the Prince of Wales's company of actors, and collaborated on many plays with Middleton and other dramatists. He was a master of stage effect, and wrote with vigor. To him are assigned *A New Wonder* (1632); *All's Lost by Lust* (1633); *A Match at Midnight* (1633); and *A Shoemaker a Gentleman* (1638).

ROWLEY POEMS. See CHATTERTON, THOMAS.

ROWLEY REGIS. A town in Staffordshire, England, 5 miles west of Birmingham (Map: England, E 4). It has extensive coal-mining and iron industries. Population, in 1891, 30,800; in 1901, 34,670.

ROWSON, rou'sŭn, SUSANNA (HASWELL) (1762-1824). An Anglo-American dramatist, novelist, and actress. Her novel *Victoria* (1786) brought her father a pension. Her husband became bankrupt, and in 1792 she sought support from the stage, coming in the next year to America, where she acted at Annapolis, Philadelphia, Baltimore, and Boston, until 1795, appearing mainly in her own plays, *The Volunteers*, a farce (1793), *Americans in England* (1797), and others. Leaving the stage, she opened in Boston a school for girls which she conducted with honorable success until 1822. She also edited *The Boston Weekly Magazine.* Of her novels the most popular was *Charlotte Temple, a Tale of Truth* (1790), founded on an adventure of a kinsman with a girl whose grave may still be seen in Trinity Churchyard, New York, with Temple sub-

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stituted for the true name, Stanley. In three years twenty thousand copies of this book were sold. A sequel to this story, *Lucy Temple*, appeared posthumously (1828), and she was author of several other novels. Consult her *Life* by Elias Nason (Albany, 1870).

ROW'TON HEATH, Battle of. A battle in the Civil War in England, fought September 24, 1645. Though the royal cause was actually lost at Naseby, Charles attempted to collect a new force in Wales. At the head of 5000 troops the King with his vanguard entered Chester, which was but partially surrounded by Brereton. Colonel Poyntz and Brereton made a combined attack on Sir Marmaduke Longdale, commander of the King's rear guard, at Rowton Heath, near Chester. The King lost about 1300 men.

ROXA'NA (Lat., from Gk. Ῥοξάνη) (?-B.C. 311). A wife of Alexander the Great. She was a daughter of the Bactrian Prince Oxyartes. Soon after Alexander's death (323), and before the birth of her son, Alexander Ægus, she induced Statira, one of Alexander's wives, to come to Babylon, and there caused her to be murdered. Her son was recognized as first of the heirs of the King, but both he and Roxana were put to death by Cassander's orders (Plutarch, *Alexander;* Arrian, *Anabasis*, vii. 27; Diodorus, books xviii. and xix.).

ROXBURGH, rŏks'bŭr-ŭ. A southeastern border county of Scotland (Map: Scotland, F 4). Area, 665 square miles. The physical aspect is varied and picturesque, with the Cheviot and Lauriston Hills bounding a considerable portion of its borders. The interior is generally fertile and is farmed to the greatest advantage. The chief river is the Tweed. Chief towns, Jedburgh, the capital, and Hawick. Population, in 1901, 48,800.

ROXBURGH, John Ker, third Duke of (1740-1804). An English bibliophile, born in London. He was appointed by George III. a lord of the bedchamber in 1767, and groom of the stole and privy councilor in 1796. He collected one of the most remarkable private libraries ever amassed in Great Britain. His more important acquisitions included a collection of works printed by Caxton, the two rare editions, both dated 1566, of the Scottish Acts of Parliament, a collection of the rare broadsides, including 1340 numbers, and Valdarfer's edition of Boccaccio, which, when the library was dispersed by sale in 1812, was bought by the Marquis of Blandford for £2260.

ROXBURGHE CLUB. A famous English book club, the first of these associations devoted to the reprinting for their members of old and rare books. It was founded in London after the sale of the magnificent collection of books formed by John, third Duke of Roxburgh, which realized nearly £25,000. The sale of the Valdarfer Boccaccio for £2260 was celebrated by a dinner at the Saint Albans Tavern, at which the club was founded, to consist of twenty-four members, each of whom was made responsible for the reprinting of one book. See Book Club.

ROX'BURY. Formerly a city in Norfolk County, Mass., but since 1868 a part of Boston (Map: Massachusetts, E 3). Roxbury was settled in 1630, and included among its early inhabitants Thomas Dudley, thrice Governor of Massachusetts, and John Eliot, who was minister here for nearly sixty years (1632-90). The famous Roxbury Latin School was established as the "Free School in Roxburie" some time between 1642 and 1645, and was endowed by Thomas Bell in 1671. Consult Drake, *The Town of Roxbury* (Roxbury, 1878).

ROX'OLA'NI. In antiquity, a warlike people of Sarmatian origin, who dwelt north of Mæotis Palus, between the Tanaïs (Don) and Borysthenes (Dnieper). They appear in history as early as the time of Mithridates the Great and about A.D. 69 had reached the boundary of Mœsia. Their dangerous inroads into the Danubian provinces induced the Emperor Hadrian to come to terms with them by paying an annual tribute. At a later period, however, they appear as Roman auxiliaries. Mention is made of them last in the eleventh century.

ROY, William (1726-90). A British military engineer and geodesist. He was born in Carluke Parish, Lanarkshire, and at the age of twenty became connected with the army. He was the first British geodesist. He was employed in preparing for the Government a map of the Highlands, and finally of the whole mainland of Scotland, which, however, owing to imperfect instruments and the hurried nature of the survey, was only, to use Roy's own words, "a magnificent military sketch." After a military career in which his engineering skill was frequently availed of, Roy devoted himself to scientific pursuits, and in 1783 was employed by the British Government to connect the geodetic surveys of France and England in order to determine the relative positions of the Paris and Greenwich observatories.

ROYAL ACADEMY OF ARTS, The. The most important of all British art institutions. It dates from 1768 and was founded by George III. Sir Joshua Reynolds was its first president. The number of academicians usually is about forty, and the number of associates is a little less. The president is knighted upon election, and the presidency is for life. Among the painters who have filled this office are Reynolds, Benjamin West, Lawrence, Eastlake, Leighton, Millais, and Poynter (1896). The first permanent rooms of the Academy were in Somerset House (1780). It removed to Trafalgar Square in 1834 and finally to Burlington House, Piccadilly, in 1869. About 2000 works of art are brought together at the Academy exhibitions, which take place each spring, and no artist may exhibit more than eight works. There are also other exhibitions, besides those of the Academy proper, which take place under its patronage. The permanent collection of the Academy contains many valuable paintings, as well as the diploma works of nearly all the academicians. The art schools of the Royal Academy, also in Burlington House, are free to all students in painting, sculpture, and architecture. The professors are academicians, and they also deliver lectures during the school year. There are several traveling scholarships, and various medals and prizes, which are awarded annually and biennially. Consult: Sandby, *History of the Royal Academy of Arts from its Foundation in 1768* (London, 1862); Laidlay, *The Royal Academy: Its Uses and Abuses* (ib., 1898); and *The Year's Art* (ib., annually).

ROYAL ANTELOPE. One of the diminutive steinboks of the genus Nanotragus, remarkable as the smallest of all the ruminants, standing

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only 12 inches high at the shoulder. It is chestnut in color on the upper part and pure white below. It is a native of the Guinea coast. Consult the *Proceedings* of the Zoölogical Society of London, for 1872.

ROYAL ARCANUM, The. A fraternal and beneficial society organized by Dr. Darius Wilson and John A. Cummings, at Boston, in 1877. Starting with nine members, the society has now in Boston a substantial building in which the business affairs are conducted and where the Supreme Council meets. The society is governed through councils, which are dominated by the Supreme Council or governing body. Benefit certificates are issued for $1000, $2000, and $3000, payable at death of a member. Should a member desire to increase his insurance over the limit fixed by the society, he can do so by making application for the increase in the Loyal Additional Benefit Association, formed in 1889, practically within the Royal Arcanum, and incorporated in 1890 in New Jersey. The following statistics of the Royal Arcanum are brought down to February 28, 1903: Number of grand councils, 27; number of subordinate councils, 2045; approximate membership, 258,746; total amount of death claims from date of organization, $76,190,352; amount of emergency fund, $1,885,786. The emblem of the society is a royal crown within a circle, on the circumference of which are ten small Maltese crosses with the motto, "Mercy, Virtue, and Charity."

ROYAL ARCH MASONS. See Masons, Free.

ROYAL FERN. See Osmunda.

ROYAL GEOGRAPHICAL SOCIETY. See Geographical Society, Royal.

ROYAL HISTORICAL SOCIETY. See Historical Society, Royal.

ROYAL INSTITUTION OF GREAT BRITAIN. An organization founded in London in 1799 and chartered in the following year as the Royal Institution for the Promotion, Diffusion, and Extension of Science and Useful Knowledge. Its principal objects are to further scientific and literary research, to spread the principles of inductive and experimental science, and to promote the application of such principles to the arts. The idea of such an institution originated with Benjamin Thompson, Count Rumford (q.v.), who was supported in the execution of his plans by Sir Joseph Banks, president of the Royal Society. It was Count Rumford's desire to extend a knowledge of the principles of physics and mechanics among the lower classes by means of public lectures and demonstrations, with a view of ameliorating the material condition of the people. Almost from the beginning the Institution assumed a leading place in the scientific world, although it was soon found necessary to depart from Count Rumford's idea of making the work of the society deal exclusively with the welfare of the lower classes. Its continued prosperity has been due chiefly to a succession of brilliant lecturers and experimenters, beginning with Thomas Young, who was professor at the Institution from 1801 to 1803, and including such great names as Sir Humphry Davy, Michael Faraday, John Tyndall, Sir Edward William Robert Grove, Sir Edward Frankland, William Odling, John Hall Gladstone, Edwin Ray Lankester, Sir James Dewar, and Lord Rayleigh. Within its laboratories have been made some of the most notable discoveries in physical and chemical science, and especially under Faraday and Tyndall valuable work was done in the popularization of these sciences. A feature of the work of the Institution is its evening lectures, at which the most eminent scientists are invited to present the latest achievements within their fields to the public. The Institution has been the recipient of many benefactions, the most noted of which is the bequest of £10,000 by Mr. John Fuller, M. P., in 1831, for the establishment of a Fullerian professorship in chemistry and physics. Young men of special aptitude are offered facilities for carrying on research work and in case of need are given pecuniary assistance. The library of the Institution contains 60,000 volumes. On June 5-7, 1899, the centenary of the Institution was celebrated with fitting ceremonies.

ROY'ALL, Isaac (c.1719-81). An American colonist, born probably in Antigua, B. W. I., where his father had large plantations. He early settled in Medford, Mass., and was chosen to fill various local offices. From 1752 until 1774 he was a councilor of the province, and in 1761, for his services in the French War, was commissioned brigadier-general, the first American to attain that rank. During the agitation which preceded the Revolution he remained loyal to the King, and three days before the battle of Lexington went into voluntary exile. After remaining for some time in Halifax, he went to England, where he died of smallpox. Though he had been proscribed and banished and his estates confiscated, in 1778 he left by will an endowment for the law professorship at Harvard which still bears his name. The town of Royalston was also named in his honor.

ROYAL NAVAL COLLEGE. A professional school of the British Navy located at Greenwich (q.v.), and formally opened in 1873. It is designed for the training of midshipmen and higher officers and affords technical instruction in the various theoretical and scientific studies, such as navigation, mathematics, engineering, ordnance, etc. See Naval Schools of Instruction.

ROYAL OAK. An oak-tree which stood near the farm of Boscobel in Shropshire, and which for twenty-four hours afforded concealment to Charles II. after the battle of Worcester in 1651. The tree was destroyed after the Restoration by relic-hunters, but an oak grown from an acorn of the original tree stands on the spot, and there is another, said to have been planted by the King, in Hyde Park.

ROYAL SOCIETY, The. A society organized in London in 1660 as 'The President, Council, and Fellows of the Royal Society of London for Improving Natural Knowledge.' It is the oldest scientific society in Great Britain and one of the oldest in Europe. The preliminary meetings were held on the suggestion of Theodore Haak, a German resident of London, at different places, principally at Gresham College, where, on November 28, 1660, the first journal of the society was opened by the originators. Gresham College became the permanent headquarters and on March 6, 1661, Sir Robert Moray was elected president, which position he held until the incorporation of the society, July 15, 1662. The charter was

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amended in 1663, and on May 13th of that year the council of the Royal Society met for the first time.

From the outset the society established and maintained correspondence with men of philosophical attainments on the Continent, from which sprang the well-known work of the society, *Philosophical Transactions*, the first number of which appeared in March, 1665. By 1750 there had been four hundred and ninety-six numbers, or forty-six volumes, issued, and it was decided that thereafter the work be published annually in volumes, under the superintendence of a committee of the council. In 1666, on invitation of Henry Howard, of Arundel, the home of the society was changed to Arundel House. Howard also presented the council with the library of his grandfather, Thomas, Earl of Arundel, which was the foundation of the fine library of over 45,000 volumes now possessed by the society. In 1710 the society moved from Arundel House to Crane Court, where it remained until 1780, when the Government assigned it apartments in Somerset House. The present home of the society is Burlington House.

The Royal Society, among other duties, has the administration of the annual Government grant of £2000 to be divided among a limited number of persons as compensation for outlay incurred by them in scientific research during the year. Four medals are awarded every year, viz. one Copley, two Royal, and a Davy. The Copley Medal was founded on a bequest from Sir Godfrey Copley in 1709, and is awarded to the living author of such philosophical research, either published or communicated to the society, as may appear to the council to be deserving of that honor. The Royal Medals were established by George IV. and are awarded annually for the two most important contributions to science published in the British dominions not more than ten years nor less than one year from making the award. The Davy Medal was founded by Dr. John Davy, brother of Sir Humphry Davy, and is bestowed annually for the most important discovery in chemistry in Europe or British America. Foreign members of scientific eminence, to the number of fifty, are also eligible for membership. The session of the society lasts from November to June, ordinary meetings being held weekly. Papers are read at various times and during the year are published in either the *Philosophical Transactions* or the *Proceedings* of the society.

ROYAL UNIVERSITY OF IRELAND. An examining and degree-conferring institution, situated in Dublin, Ireland. It was established by the University Education Act of 1879 and was formally organized in 1880. The Queen's University in Ireland, established in 1850 and consisting of the Queen's College at Belfast, Cork, and Galway, was dissolved in 1880 and superseded by it. It confers the various degrees in arts, sciences, engineering, music, medicine, and law. Diplomas are also granted in treatment of mental diseases, sanitary science, teaching, and agriculture. Both sexes are equally eligible for the examinations.

ROYAN, rwä'yäN'. A seaside resort in the Department of Charente-Inférieure, France, at the mouth of the Gironde, 22 miles southwest of Rochefort. It is a well-built town with a handsome municipal casino. Royan dates from a priory in which the Abbé de Brantôme wrote part of his memoirs. As a Huguenot stronghold it was besieged by Louis XIII. in 1622. Permanent population, in 1901, 8374.

ROYCE, Josiah (1855—). An American philosopher, born at Grass Valley, Nevada County, Cal. He graduated at the University of California (Berkeley) in 1875, studied also at Leipzig, Göttingen, and the Johns Hopkins University (Ph. D., 1878), in 1878 was appointed instructor in English in the University of California, and in 1882 instructor in philosophy in Harvard. In 1885 he became assistant professor, and in 1892 was advanced to the chair of the history of philosophy. In addition to a work of fiction, *The Feud of Oakfield Creek* (1887), his publications include *A Primer of Logical Analysis, for the Use of Composition Students* (1881), *The Religious Aspect of Philosophy* (1885), *California from the Conquest in 1846 to the Second Vigilance Committee in San Francisco* (1886; in the "American Commonwealths" series), *The Spirit of Modern Philosophy* (1892), *The Conception of God* (1895), *Studies of Good and Evil* (1898), *The Conception of Immortality* (1900; Ingersoll lecture on Immortality, Harvard), and *The World and the Individual* (2 vols., 1900-01: series i., The Four Historical Conceptions of Being; series ii., Nature, Man, and the Moral Order), being the Gifford lectures delivered at the University of Aberdeen, Scotland, in 1899-1900. Professor Royce also wrote a brief *Psychology* (1903), laying particular emphasis upon the psychical characterization and development of the 'self.' In metaphysics Royce is considered to be one of the foremost exponents of neo-Hegelianism in America, and his work in popularizing and interpreting the abstrusities of Hegel has been of great importance. Of still greater significance have been his original contributions, especially on the development of the concept of the 'self' or individual, his expositions of idealism, his doctrine of truth and error, and his insistence upon the ethical aspects of philosophy.

ROYER-COLLARD, rwä'yä' kô'lär', Pierre Paul (1763-1845). A French statesman and philosopher, born at Sompuis (Marne). He practiced law and held various offices after the outbreak of the Revolution. Being proscribed for his moderate views during the Reign of Terror, he returned to his old home at Sompuis, and lived as a farmer, in order to evade the suspicions of the Jacobins. In 1797 he was elected to the Council of the Five Hundred, but after the 18th Fructidor he retired from politics. In 1809 he accepted the chair of philosophy in the newly created University of France and soon came to exercise an immense influence on philosophic thought in France. He rejected the sensualist system of Condillac, and adopted an eclectic philosophy, giving special prominence to the principles of the Scottish school of Reid and Stewart. In August, 1815, he was appointed president of the Commission of Public Instruction, which office he held, with the title of councilor of State, till July, 1820. In 1815 also the electors of Marne chose him as their Deputy. In 1817 Royer-Collard for the first time withdrew his support from the Government, and in 1819 the rupture was complete. In spite of his royalist leadings, he founded the political party of the Doctrinaires in 1820

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(see DOCTRINAIRE), and advocated a constitutional monarchy. The French Academy elected him to membership in 1827, and in 1828 he was named president of the Chamber of Deputies. In that capacity Royer-Collard had to present the famous address of the 221 Deputies (March, 1830), refusing their support to the Government, which the King declined to hear read. On the next day the Chamber was prorogued. After the Revolution of July, 1830, he reëntered politics, but in 1842 he withdrew completely from public life. Consult the biographies by Philippe (Paris, 1857); Lacombe (ib., 1863); Barante, containing many of his speeches (ib., 1878); also Faguet, *Politiques et monarchistes du XIXème siècle* (ib., 1891).

ROYLE, JOHN FORBES (1799-1858). An English naturalist, born at Cawnpore, India. He studied at the Military Institute of the East India Company, Addiscombe, was appointed assistant surgeon to the company, and served on the medical staff of the army of Bengal. In 1823 he was appointed physician at the station of Saharunpore, and superintendent of the garden there. In that post he made useful researches in botany and meteorology. He was appointed professor of materia medica at King's College, London, in 1837, and in the same year was elected a fellow of the Royal Society. He was a careful observer, and accurate in his published writings, more especially those on technical matters. Among his works are: *An Essay on the Antiquity of Hindoo Medicine* (1837); *On the Culture and Commerce of Cotton in India and Elsewhere* (1851); and *The Fibrous Plants of India Fitted for Cordage* (1855). Consult Britten and Boulger, *Biographical Index of British and Irish Botanists* (London, 1893).

ROY'TON. A town in Lancashire, England, 2 miles north-northwest of Oldham (Map: England, D 3). It has large cotton industries. The town has undergone much modern improvement, maintains gas and water supplies, and owns markets. Population, in 1901, 14,880.

ROZE, MARIE (1848—). A French operatic singer, born in Paris. She studied at the Paris Conservatory, where she gained the highest honors. She first appeared in opera in 1867, singing the part of Hérold's *Marie* with great success. At the end of three years she withdrew to study grand opera under Wartel, Gounod, and Ambroise Thomas, reappearing as 'Marguerite' in *Faust* at the Grand Opera with much success. During the siege of Paris she remained in the city, turning her house into a hospital for the wounded, and organizing numerous concerts for their benefit. After the war she made a tour through the principal cities of Europe, and first appeared in London in 1872, where for four years she sang in the Italian opera. In 1877 she married Henry Mapleson, and began a two years' tour in the United States, returning to London after its completion, where she became a popular concert and oratorio singer.

RUABON, rōō-ä'bŏn. A parish town and railway junction of Denbighshire, Wales, on the Dee, 5 miles southwest of Wrexham (Map: Wales, C 4). Iron ore and anthracite coal are mined extensively in the neighborhood, and there are important iron works and brick and tile factories. Population of parish, in 1891, 17,609; in 1901, 21,721.

RUÁTAN, rōō'ä-tän', or **ROATÁN.** The largest of the Bay Islands (q.v.).

RUBAIYAT, rōō-boi'yăt (Arabic plural of *rubā'ī*, quatrain, from *arba'a*, four). The term applied to a collection of Persian quatrains. The *rubā'ī*, or quatrain, is the distinctive Persian metre, and has the following verse-scheme, read from right to left:

— ⏑ ⏑ — | — ⏑ ⏑ — | — ⏑ ⏑ — —
| — ⏑ — ⏑

with the rhyme *aaaa* or *aaba*. The rhyme may, however, go back several syllables, or even words, as in the following example cited from the forty-fifth quatrain of Payne's translation of Omar Khayyam:

Skinker, since ruin is of Fortune planned for thee and me,
This nether world is no abiding land for thee and me;
Yet, so the wine-cup in the midst but stand for thee and me,
Rest thou assured the very Truth's in hand for thee and me.

There are many variations in rhyme which may become as intricate as quatrain 770 of the same translation:

I spake, thou spakest: heart gave I thee, thou me disdain.
I take, thou takest: thou heart from me, I from thee pain.
I am, thou art, too—thou merry and I for thee sad.
I make, thou makest: thou wrong and I patience in vain.

Nearly all the poets of Persia include in their works a Rubaiyat. Through the translation of Omar Khayyam (q.v.) by Edward FitzGerald (q.v.) this quatrain, modified to the English heroic metre of the iambic pentameter, was made an English verse-form. For a knowledge of the metrical variations in Persian with an exact reproduction in English, consult Payne, *Quatrains of Omar Khayyam of Nishapour* (London, 1898).

RUBASSE, rụ'băs' (Fr., red-colored quartz), ANCONA RUBY, or MONT BLANC RUBY. A variety of crystallized quartz containing occluded spangles of hematite or specular iron, which reflect a bright red color resembling that of the ruby.

RUBATO, rōō-bä'tō, TEMPO (It., stolen). In music, a phrase indicating that the performer is to modify the regular rhythmic movement, by emphasizing, and thus prolonging, important notes. The less important notes of the bar must consequently be curtailed, so that its aggregate value may remain unchanged.

RUBBER (from *rub;* perhaps connected with Gael. *rub*, Welsh *rhubio*, to rub, Ir. *ruboir*, Gael. *rubair*, a rubber), INDIA-RUBBER, or CAOUTCHOUC. A substance which, on account of its peculiar properties, is much used in the arts. Probably no single article has within the past century experienced more rapid growth in its relation to commerce and manufactures. Rubber is not, as is often supposed, the product of a single species of trees, but is produced by a number of different kinds, all of them thriving in tropical climates only. Some of them require a moist, alluvial soil, and others flourish in a stony soil, with only an intermittent rainfall. Rapidly as the consumption of rubber has increased, there seems no danger of exhausting the world's supply, so abundant and widely scattered are its sources. In 1900 india-rubber forests of vast extent and superior quality were found in Bolivia, and other similar regions doubtless await the explorer. The Province of Pará, in Brazil, furnishes the largest quantity and best quality of rubber yet known to commerce, the standard by which all other varieties are compared.

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The first record of india-rubber was made in accounts of Columbus's second voyage to America, where it is related that he found the inhabitants of Hispaniola (Haiti) amusing themselves with rubber balls. In a book published in Madrid in 1615, Juan de Torquemada mentions the tree which yields rubber in Mexico, describes the mode of collecting the gum, and states that it is made into shoes; also that the Spaniards use it for waxing their canvas cloaks to make them resist water. It was at first known by the name of *elastic gum*, and received that of india-rubber from the discovery of its use for rubbing out lead-pencil marks. It is stated that the first rubber was brought into the United States in 1800, the very year in which was born Charles Goodyear (q.v.), a man whose inventions made possible the modern rubber industry.

India-rubber is obtained from the milky juice of the rubber tree. This is not the true sap, but a secretion which does not seem to be essential to the life of the plant. In this juice float minute globules of rubber which, when the juice is allowed to stand, rise to the top, like cream. Various methods are employed for collecting the sap, the future character of the rubber depending much upon how this is done and the separation of the caoutchouc from the aqueous liquid is effected. The annual yield of a single tree is from 2 or 3 to 16 or 17 pounds. The rubber is sometimes collected by simply cutting the trees down, but this wasteful method has been in most cases abandoned, and it is customary to make incisions in the trunk through which the milk oozes out. The trees are tapped at sunrise, as the milk is supposed to flow more freely during the morning hours. The first row of incisions is often made in a circle surrounding the tree about six feet from the ground, the next morning a row somewhat lower down is made, and so on, each succeeding morning till the ground is reached. In each incision a little clay cup, molded by the workman and holding about a gill, is placed, and its contents emptied daily into a larger vessel, in which it is allowed to smolder over a slow fire until the water is evaporated and the rubber shaped into cakes is ready for export. This is the almost universal method of collecting Pará rubber. Recently, however, in regions where the rubber milk is collected in large amounts, a more scientific means has been adopted for obtaining the caoutchouc by using a machine similar to a cream separator which collects the rubber on the top quite as effectually, and causes the water and all impurities to be driven to the bottom.

A favorite but wasteful way of collecting rubber is followed by the natives of Central America and Assam, who allow the milk to run into a hole in the ground and after the water is absorbed a spongy mass is left, mixed with dust and leaves. In Africa and New Guinea the natives smear their bodies with the milk, and after this has evaporated scrape off the layer of caoutchouc which has dried on the skin and mold it into little slabs or cubes. In Fiji the milk is taken into the mouth and the small pellets thus formed are heaped and molded into balls. In Borneo, Africa, and some parts of Brazil, salt water is used to form the clot. The *Pernambuco* rubber of commerce is produced in this way. Sometimes the milk is simply allowed to trickle down the tree and dry in tears as it flows. These scraps and strings are collected and molded into balls. The *Ceará* rubber, a dry elastic rubber, free from stickiness, is produced in this way. At the close of the nineteenth century the world's annual production of rubber was about 57,500 tons, of which 21,000 tons are consumed in the United States and Canada and as much more in Great Britain. Of this amount the chief producers were: the Amazon district, 25,000 tons; the rest of South America, 3,500 tons; Java and Borneo, 1000 tons; East and West Africa, 24,000 tons; India, Burma, and Ceylon, 500 tons.

The manufacture of rubber did not begin till about 1820. The application of rubber to the making of waterproof cloth first gave it commercial importance, although it had been previously made into flexible tubes, for the use of surgeons and chemists, and into bottles. Waterproof cloth was first made by Charles McIntosh, a Scotch chemist, who reduced the rubber to a solution in naphtha and spread it between two layers of cloth. Waterproof coats still bear his name. In 1852 a Boston sea-captain imported into America 500 pairs of rubber boots which had been made by the natives of Brazil. These were readily sold for from $3 to $5 per pair, and a great demand for them was created. During the next 15 years probably more than 1,000,000 pairs were sold. In the meantime William Chaffee had developed a rubber varnish for coating different materials to make them waterproof. In 1833 the Roxbury India Rubber Company was formed and for a time the new enterprise flourished. But it was soon found that these waterproofed articles had an unfortunate tendency to grow hard and crack in the winter and to become soft and sticky in the summer. The demand for them ceased and their manufacture was given up.

Charles Goodyear, an unsuccessful merchant, in the meantime had turned his attention to the manufacture of rubber goods and was striving to find some process which would obviate the defects of pure rubber and render it less susceptible to the influence of heat and cold. He tried mixing it with magnesium, with quicklime and water, and with nitric acid. It had already been discovered by Leudersdorf, a German chemist, and also by Nathaniel Hayward of Woburn, Mass., that by mixing dry sulphur with rubber its stickiness was removed. Hayward's patent and process were acquired by Goodyear, who, by accident, dropped upon a hot stove some of the mixture, and found to his astonishment that the high heat did not melt it. He next placed it in extreme cold and its texture still remained unchanged. Thus after years of patient experimenting, the art of *vulcanizing* was accidentally discovered. Goodyear immediately developed the process and placed it upon a commercial basis.

VULCANIZING is simply the process of mixing sulphur with rubber and then subjecting the mixture to moderate heat (say 300° F.) for six or more hours. Its effect is to render rubber elastic, impervious, and unchangeable in texture under all ordinary conditions. The product varies from soft to hard, according to the amount of sulphur and heat applied. Although sulphur is the only essential ingredient, other materials are often added at the same time, as silicate of magnesium, carbonate of lead, asphalt, and tar, each of which imparts a different quality to the product.

Commercial rubber is a tough fibrous substance, possessing elastic properties in the highest

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degree. Reduced to the temperature of freezing water (32° F.), it hardens, and in greater part, if not entirely, loses its elasticity, but does not become brittle. When heated, as by placing in boiling water, it softens, and becomes very much more elastic than at ordinary temperatures, though it does not in any degree dissolve in the water. If suddenly stretched to seven or eight times its original length, it becomes warm; and if kept in this outstretched form for several weeks, it appears to lose, in great part, its elastic properties, and in this condition is readily cut into those thin threads which are used in the *elastic* put in gloves, bonnets, etc., and the elasticity of which is readily renewed by the application of gentle heat. Elastic thread is now prepared with vulcanized rubber. Commercial rubber is insoluble in water and alcohol, is not acted upon by alkalies or acids, except when the latter are concentrated, and heat is applied; but is soluble in ether, chloroform, bisulphide of carbon, naphtha, petroleum, benzol, and the essential oils of turpentine, lavender, and sassafras. Many other essential and fixed oils, when heated with caoutchouc, cause it to soften, and produce thick glutinous compounds, especially linseed oil. When heated to 248° F., caoutchouc fuses; and at 600° it is volatilized, at the same time undergoing decomposition, and yields a liquid called *caoutchoucine* or *caoutchisine*, possessing great solvent powers over rubber and other substances.

There are some useful applications of india-rubber in the liquid or semi-liquid state, which it is worth while to note; thus, when melted at 398° F., and mixed with half its weight of slaked lime, it forms a useful cement, which can be easily loosened, but it will dry and harden if red lead is added. A very tenacious glue is formed by heating rubber, coal tar, and shellac together. It forms an ingredient in some special kinds of varnishes, and it also improves the lubricating qualities of mineral oils, when a small quantity is dissolved in them. Pure india-rubber is now used only to a limited extent in the arts, but it is applied in the vulcanized state to an almost endless variety of purposes.

PROCESS OF MANUFACTURE. The first step in the manufacture of crude rubber is one of thorough cleansing. The rubber is allowed to remain in steam-heated water for about twenty-four hours, after which it is cut up and the larger impurities removed by hand. It is then washed by passing between two heavy corrugated iron rollers. A stream of water flows over the rubber from a pipe directly at the point of contact with the rollers, and the combined action of the rollers and water removes all foreign substances adhering to the rubber. The rubber is next placed in drying chambers and after thorough drying is stored in a dark, dry room until needed.

Methods of vulcanizing vary with the article to be vulcanized, but in general the purified and masticated gum is thoroughly kneaded with the requisite amount of sulphur and cut and shaped before heat is applied. In case the goods are to be made of a rubber cloth, as in the case of shoes (q.v.), the rubber is spread on its backing with heated iron rollers and the goods made up before they are vulcanized. The material is not sewed, but held together by some solvent, as turpentine, which makes the edges adhere. To prevent adhesion of the articles during the vulcanizing process, they are very carefully packed, and powdered soapstone, talcum, or other powder is freely used. The rubber is heated in a cast-iron cylindrical oven with one end fitted as a door.

Goodyear invented two different kinds of rubber, the pliable *soft rubber* and *hard rubber*, or ebonite, which is used for making a great variety of utensils and fancy articles. The chief difference between the two is in the amount of sulphur used and heat applied.

A few general classes of vulcanized rubber goods are: (1) Footwear and other waterproof clothing; (2) mechanical goods, including hose, belting, tires, etc.; (3) electrical and other scientific appliances; (4) medical and surgical apparatus and allied articles; (5) hard rubber goods; (6) liquid or semi-liquid materials, as varnishes and cements. This classification is obviously imperfect, but it will serve to suggest the enormous variety of commercial products of which india-rubber is an essential constituent. In electrical appliances rubber is almost indispensable as an insulating material. Recently this field has been extended by substituting it for gutta-percha in insulating submarine cables. (See CABLES, ELECTRIC.) During the last decade of the nineteenth century the value of the crude rubber imported into the United States increased from $18,020,804 in 1891 to $31,555,483 in 1900. This increase of value was caused not only by the additional amount consumed, but also by the rise in price, which in 1900 was 63 cents per pound. With the increase in cost of the raw product, old rubber is more and more used for re-manufacture.

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RUBBLE. See MASONRY.

RUBEFACIENTS (from Lat. *rubefaciens*, pres. part. of *rubefacere*, to make red, from *rubere*, to be red, from *ruber*, red + *facere*, to make). Substances employed in medicine for the purpose of stimulating and reddening the skin over the part to which they are applied. These agents have the power of relieving congestion, pain, spasm, or excessive irritability of superficial parts or deep-seated organs. All substances which after a certain period act as blisters may be made to act as rubefacients if their time of action is shortened. Among the most commonly used rubefacients may be mentioned: *Heat* in the form of hot baths, cloths soaked in very hot water, poultices, bottles filled with hot water, and heated solids such as bricks, sand-bags, etc. *Mustard*, either in the shape of mustard leaves (sheets of paper coated with mustard and applied moist) or thick poultices, composed of various proportions of mustard, mixed with flour or meal and cold water. (See POULTICE.) *Oil of Turpentine*, applied by means of flannels wrung out of hot water and sprinkled with the oil—the turpentine stupe, or as a liniment. *Ammonia* in the form of a liniment (volatile liniment). *Capsicum* (cayenne pepper) in the form of a poultice or alcoholic lotion is much used in the West Indies. *Cantharidin* (Spanish fly) is properly

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a blistering agent, but may be used as a rubefacient if modified by the free admixture of soap or resin plaster. Plasters of Burgundy pitch and resin cerate are also slightly rubefacient. Rubefacients are used to reduce inflammations or congestions, as in pleurisy and pneumonia; to cause the absorption or removal of inflammatory products as found in chronically enlarged joints; to relieve pain and spasm, as in neuralgia and intestinal cramp. See COUNTER-IRRITANTS.

RUBELLITE (from Lat. *rubellus*, reddish, diminutive of *ruber*, red). The pale rose-red or pink variety of tourmaline, of which the gem varieties in the United States come chiefly from the famous locality of Mt. Mica, near Paris, Me. Excellent gem varieties of rubellite are also found in Ekaterinburg, in Siberia, and on the island of Elba.

RU'BENS, PETER PAUL (1577-1640). The chief master of the Flemish school of painting, one of the most prolific and versatile artists of all times. He was born at Siegen, Westphalia, June 29, 1577, son of Jan Rubens, a lawyer of Antwerp. His father had come to Cologne in 1568, but, owing to his illicit relations with Anna of Saxony, wife of William of Orange, was kept in temporary captivity at Siegen. After his death at Cologne in 1587, the widow returned to Antwerp, where Peter Paul frequented school for three years, then was a page in the service of Countess Lalaing. He began his artistic training under Tobias Verhaegt, a mediocre landscape painter, then studied four years (1592-96) under Adam van Noort and, until 1600, under Otto van Veen, being in the meanwhile received as master into the guild in 1598. The works of the great Italian colorists attracted him to Venice in May, 1600, and in the same year Duke Vincenzo Gonzaga made him his Court painter at Mantua. Sent to Rome in 1601 to make copies of old masters, Rubens also executed there, for Archduke Albert, Governor of the Netherlands, three altarpieces in the Church of Santa Croce in Gerusalemme, which are now at Grasse, in Southern France. In 1603 Gonzaga made him the bearer of presents to King Philip III. of Spain, whence he returned to Mantua in 1604, then was in Rome again from the end of 1605 till June, 1607, when the Duke summoned Rubens to accompany him to Genoa. The special interest he took here in the works of architecture resulted in the publication, in two parts, of 136 engravings, under the title, *Palazzi antichi di Genova* (Antwerp, 1613 and 1622). For the Church of Sant' Ambrogio at Genoa he painted (at what period it is not known) the "Miracle of St. Ignatius," a work of great splendor. Stopping at Milan, on his return, he made drawings of Leonardo da Vinci's "Battle of Anghiari" and "Last Supper," which are both in the Louvre. In 1608 we find him once more in Rome, studying the great masters, and occupied with several compositions of his own, when news of his mother's illness called him back to Antwerp. Intending, after her death, to return to Mantua, he was induced to remain, by Archduke Albert, who appointed him his Court painter. In 1609 he married Isabella Brant, with whom he appears depicted in the splendid portrait of 1610, in the Pinakothek at Munich. A highly finished work of his Roman period is the "Saint Jerome," in the Dresden Gallery.

His first great commission came from the city of Antwerp, to paint for the city hall an "Adoration of the Magi" (1610), of large size and glowing color, now in the Madrid Museum. In the same year he completed the famous "San Ildefonso Altar," now in the Vienna Museum, a work of unsurpassed mastery in the combination of chiaroscuro effect with luminous color, and the "Elevation of the Cross," which, with its far-famed companion piece, "Descent from the Cross" (1612), adorns the Antwerp Cathedral. A modified treatment of the latter subject is in the Hermitage, Saint Petersburg, which contains also one of his most successful mythological subjects, dating from between 1612 and 1615, the "Perseus and Andromeda," an equally fine version of which is in the Berlin Museum. To this period belong also the exquisite "Madonna Surrounded by Children," in the Louvre, and the genial group of "Children with a Fruit Garland" (c.1615), in the Pinakothek, Munich. Dated 1614 are a small but precious "Flight into Egypt," in Cassel, and a highly finished "Pietà" in the Vienna Museum, of which there is a larger replica, with landscape by Jan Breughel, in the Antwerp Museum. Breughel also painted the fine garland around the "Madonna with Angels," in the Pinakothek, Munich, which bears the features of Isabella Brant.

From the first, after his settling at Antwerp, pupils had flocked to his studio in such numbers that, as early as 1611, he was obliged to refer applicants to other masters for years in advance. With the constant increase of orders, he availed himself of the assistance of his pupils in the execution of the larger paintings and of replicas frequently in demand. Such works were more or less retouched by him to give them the impress of his genius. But he also often worked in conjunction with his fellow-artists, notably, beside Breughel, with Frans Snyders, who was his collaborator in the spirited "Boar Hunts," in the Dresden and Munich Galleries, and in the "Chase of Diana," in the Berlin Museum. Rubens himself was an animal painter of the first rank, witness the "Lion Hunt" (1616), in the Pinakothek at Munich. That gallery also contains several of his most important religious and mythological pictures of this period, to wit: the "Last Judgment" (2 treatments, 1616 and 1618), "Christ and the Four Sinners" (c.1619), "Nativity" (1620), "Descending of the Holy Ghost" (1620), "The Chaste Susanna," the "Assumption," "Castor and Pollux Abducting the Daughters of Leucippus," "Meleager and Atalanta" (same subject in Cassel), "Drunken Silenus" (1617), and above all "The Battle of the Amazons" (1619), his most famous example of depicting the tumult of battle. Other masterpieces of this period are: "The Conversion of Saul" (c.1617, Berlin Museum); "Scourging of Christ" (1617, St. Paul's, Antwerp); "Expulsion of Hagar" (1618, Hermitage, Saint Petersburg); "The Miraculous Draught of Fishes" (1616-18, Church of Our Lady, Mechlin), a striking piece of realistic conception; "St. Ignatius Casting Out Devils" (Vienna Museum); "Incredulity of Thomas" (1615), "Christ à la Paille" (c.1617), "Last Communion of Saint Francis" (1619), "Christ on the Cross" (known as "Le Coup de Lance," 1620, a work of remarkable dramatic effect), all in the Antwerp Museum. Among the numerous Madonnas, one of the most sympathetic is "Mary, the Refuge of Sinners" (c.1619, Cassel Gallery), which

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PETER PAUL RUBENS
"THE DESCENT FROM THE CROSS," FROM THE PAINTING IN NOTRE-DAME CATHEDRAL, ANTWERP

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plainly shows the coöperation of Van Dyck. Mythology is represented by "Jupiter and Callisto" (1613) and "Meleager and Atalanta," both in the Cassel Gallery; "Neptune and Amphitrite" (c.1612-14), "Bacchanal" (c.1618-20, with Van Dyck), and "Andromeda" (c.1638), all in the Berlin Museum; "Jupiter and Antiope" and the "Freezing Venus" (both, 1614, Antwerp Museum); "Venus in the Smithy of Vulcan" (Brussels Museum); "Judgment of Paris" (Madrid Museum); "Boreas and Oreithyia" (Vienna Academy); "Bacchanal," "The Daughters of Cecrops," and "Toilet of Venus" (all in the Liechtenstein Gallery, Vienna). Of allegories there are the "Hero Crowned by Victory" (Dresden), replicas in Cassel (1617), Munich, and Vienna; "Tigris and Abundantia" (c.1610, Saint Petersburg); "The Four Quarters of the Globe" (Vienna Museum); "The Terrors of War" (1638, Palazzo Pitti, Florence). In 1622 Rubens was called to Paris by Maria de' Medici, to adorn the Luxembourg Palace with the chief episodes from her life. The twenty-four paintings executed within three years by his pupils from his designs were taken by him to Paris, where they now occupy a separate room in the Louvre; the sketches of eighteen of them are in the Pinakothek at Munich. Another series to represent the history of Henry IV. was only partly finished (1628-30). For Louis XIII. he completed (1622) twelve cartoons for tapestry with the history of Constantine the Great.

Having already undertaken diplomatic missions in 1623-25, for the Infanta Isabella (Regent after the death, in 1621, of Archduke Albert), he was intrusted in 1627 with the negotiations concerning the conclusion of peace between England and Spain. He went to Madrid in 1628 and thence with the King's instructions in 1629 to London, where he brought his mission to a successful ending and was knighted by Charles I. in 1630. The same distinction was conferred upon him by Philip IV. of Spain. In Madrid, as well as in London, his brush was in great demand, especially for the painting of portraits; in Madrid he also renewed the study of Titian, which strongly influenced the works of his later period. In 1626 his wife had died, leaving him with two sons, and in December, 1630, he married the youthful Helene Fourment, who bore him two more sons and three daughters. Her features are preserved to us in numerous portraits, which her admiring husband never tired of painting at various stages. Noteworthy among the master's later works, and some of the earlier not as yet mentioned, are the "Conversion of Saint Bavon" (1824, Ghent Cathedral); "Adoration of the Magi" (1824), Antwerp Museum, an imposing composition, containing many figures over life-size, said to have been painted in a fortnight; "Lot's Family Leaving Sodom" (1625, Louvre); "Assumption" (1626, altarpiece, Antwerp Cathedral); "Last Supper" (completed 1632, Brera, Milan); "Holy Family Under an Apple-tree" (Vienna Museum); "The Way to Golgotha" (c.1636, Brussels Museum); "Samson Taken Prisoner" and "Massacre of the Innocents" (c.1637, both in the Pinakothek, Munich); "Bathsheba at the Bath" and "Quos Ego" (1634, both in Dresden Gallery); "Saint Francis Receiving His Stigmata" (c.1638, Cologne Museum); "Crucifixion of Peter" (1639, Saint Peter's, Cologne), vigorous, but of repellent fidelity to nature; and a "Santa Conversazione," for the altar of his mortuary chapel, one of his last and finest works. A work of great thought in the expression of religious enthusiasm is "The Brazen Serpent" (c.1625-30), in the Madrid Museum. Of historical compositions the most prominent are "Saint Ambrose Forbidding the Emperor Theodosius to Enter the Church" (Vienna Museum); "Apotheosis of William of Orange" (National Gallery, London), which also contains the "Triumph of Julius Cæsar;" and an allegory, "War and Peace," presented by Rubens to Charles I. in 1630. In the Metropolitan Museum, New York, the master is represented by "Return of the Holy Family from Egypt" (c.1610), "Susanna and the Elders" (c.1635), and "Pyramus and Thisbe."

His landscapes, about fifty in number, the majority of which date from after 1635, are models of arrangement and coloring, and may be judged by the examples preserved in the galleries of London, Dresden, Munich, Vienna, the Louvre, and the Palazzo Pitti, Florence. Even the genre is ingeniously represented by "La Ronda," a dance of Italian peasants, in the Madrid Museum, and the splendid "Kirmess" (c.1636), in the Louvre. Of the famous so-called "Garden of Love," styled by Rubens himself "Conversatie à la mode," the picture in the Madrid Museum is the original, while the more familiar specimen in Dresden is a good school-piece. A less restrained atmosphere pervades the subject called the "Festival of Venus," in the Vienna Museum, which contains another genre piece, entitled "The Château-Park." His eminence as a portrait painter is attested by the numerous specimens in the foremost galleries of Europe, among which may be mentioned the group portrait in the Palazzo Pitti, Florence, known as the "Four Philosophers" (the artist, his brother Philip, and two scholars), and the portraits of himself in Windsor Castle (with Helene Fourment), and in the Vienna Museum. Among several of Isabella Brant, that in Saint Petersburg (c.1620) is the finest. Most attractive are "Rubens' Sons" (c.1627), in the Liechtenstein Gallery, Vienna, and in Dresden. Helene Fourment is depicted in the galleries of Amsterdam, The Hague, Munich (three, besides the "Family Group in the Garden"), Florence, and Saint Petersburg, also with two children, in the Louvre (unfinished), and as "Saint Cecilia," in Berlin. Celebrated is the portrait of 1620, known as the "Chapeau de paille," in the National Gallery, London. Others of note are those of Jean Charles de Cordes and his wife (1618), in Brussels; of Baron Henri de Vicq, in the Louvre; of Maria de' Medici, in Madrid; of Dr. van Thulden (c.1620), and of an "Old Scholar" (1635), in Munich; and of "Jan van der Moelen" (1616), in the Liechtenstein Gallery, Vienna.

For several years a victim to gout, the great master, in the fullness of his power, succumbed to paralysis of the heart at Antwerp on May 30, 1640, and was buried with great pomp in the Church of Saint Jacques. An Eclectic in the highest sense of the term, his inspirations derived from the great Italian masters served to establish a bond of union between the art of Italy and that of the North, without in any wise involving a sacrifice of his individual tendency toward a sound realism. In power of invention he can be compared only to Dürer and Raphael. The lofty strain of his composition,

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his extraordinary facility of production and the sensuous brilliancy of color, his inimitable treatment of the nude and wonderful luminosity of flesh tones, exercised a far-reaching influence upon his contemporaries and disciples, which was felt in Flemish art for more than a century, extending to every branch of painting. In the nineteenth century it proved an inspiration to the Romanticist movement, not only in Belgium, but in Europe. Of his extremely numerous pupils Van Dyck was the most famous, and Theodor van Thulden was his favorite. The number of his paintings amounted to 1300, nearly two-thirds of which were by his hand alone. He also educated a school of engravers, which acquired fame through the reproduction of his renowned works, and a large number of drawings bear witness to his industry also in that field. Rubens was a man of scholarly attainment and universal culture, who had a thorough command of Latin and six other languages, and corresponded with many distinguished contemporaries.

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RUBEOLA. See MEASLES.

RUBIACEÆ (Neo-Lat. nom. pl., from Lat. *rubia*, madder, from *rubens, ruber*, red). THE MADDER FAMILY. One of the largest orders of dicotyledonous plants, consisting of more than 350 genera and 4500 species of trees, shrubs, and herbs most abundant within the tropics. Various schemes of classification of this order have been presented, some botanists limiting it to the herbs like Galium, etc., but most systematists extending it to include much larger numbers. The classification of Schumann as given by Engler divides the order into two suborders, Cinchonoideæ and Coffeoideæ, both of which are again subdivided, twenty-one tribes being recognized. Some of the better known and more important genera are: Houstonia, Cinchona, Gardenia, Guettarda, Chiococca, Coffea, Uragoga (which includes Cephælis), Coprosonia, Morinda, Asperula, Galium, and Rubia. The name of the family is derived from Rubia tinctoria, the madder.

RU'BICON. The ancient name of a stream flowing into the Adriatic, which formed the boundary between Cisalpine Gaul and Italy proper. It obtained a proverbial celebrity from the well-known story of its passage by Cæsar, who, by crossing it in B.C. 49, virtually declared war against the Republic. Hence the phrase 'to cross the Rubicon' has come to mean to take an irrevocable step. The modern Luso, called by the peasants on its banks *Il Rubicone*, has claims to being the ancient Rubicon; but arguments preponderate in favor of the Fiumicino.

RUBIDIUM (Neo-Lat., from Lat. *rubidus*, reddish, from *ruber*, red). A metallic chemical element discovered by Bunsen and Kirchhoff in 1861, by means of the spectroscope, in the mineral waters of Dürkheim, Germany. It is found with cæsium in the minerals lepidolite and petalite, in the waters from various springs, in the ashes of seaweed and tobacco, in tea, and in beetroot molasses. Bunsen separated rubidium chloride by evaporating large quantities of the mineral water mentioned above, and then subjecting the molten chloride to the current of an electric battery, when the metal rose to the surface in the form of globules. It is more commonly obtained by heating a mixture of sugar-charcoal, charred acid rubidium tartrate, and calcium carbonate at a white heat, in an iron cylinder connected by an iron tube with a glass receiver, into which the rubidium distills over.

Rubidium (symbol Rb; atomic weight, 85.43) is a silver-white soft metal that melts at 38.5° C. (101.3° F.) and evolves a bluish vapor at a dull red heat. It oxidizes rapidly in the air and decomposes water with ignition of the liberated hydrogen. It is the most positive element next to cæsium. With oxygen it forms a monoxide similar to that of potassium, and its salts are readily recognized by the red color that they exhibit when heated in the non-luminous flame of a Bunsen burner.

RUBINSTEIN, rōō'bĭn-stīn, ANTON (1830-94). A famous Russian pianist and composer, born at Wechwotynecz, near Dubossary, Government of Kherson, of Jewish parentage. His mother commenced his musical education when he was but four years of age, and in two years he had exhausted her knowledge. He was then placed under Villoing. In 1840 he entered the Paris Conservatory and shortly afterwards attracted the attention of Liszt, Chopin, and Thalberg. He stayed in Paris eighteen months, after which he made some extraordinarily successful tours. His parents, who for business reasons had moved to Moscow soon after his birth, about this time (1844) moved to Berlin, a step strongly advised by Liszt. There Anton was placed under the famous Dehn for composition and theory. From 1846 to 1848 he was thrown on his own resources, his parents having returned to Moscow, and he took up teaching in Vienna, returning to Russia in 1848, and settling in Saint Petersburg. Here he came under the patronage of the Grand Duchess Helen, and for the following eight years studied and wrote assiduously, producing several operas, and accumulating the manuscripts which subsequently brought him a world-wide fame as a composer. He made a tour of Germany, France, and England (1857), and upon his return to Saint Petersburg in 1858 received the appointment of Court pianist, and conductor of the Court concerts. He founded the Saint Petersburg Conservatory of Music (1862), and remained its director until 1867. In 1861 he organized the Russian Musical Society, and in 1889 was decorated with the Order of Vladimir, which

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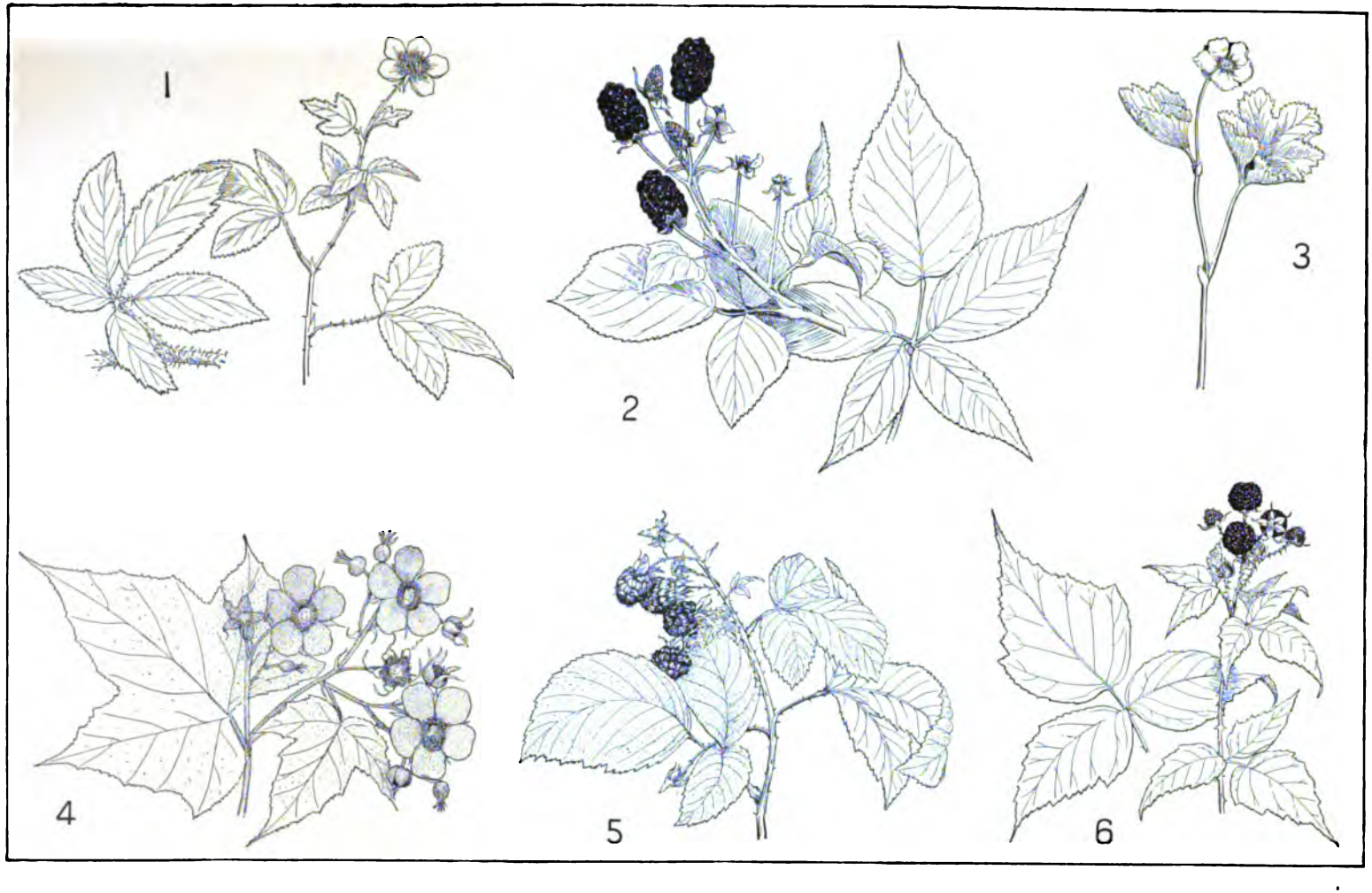
RUBUS



1. SOUTHERN DEWBERRY (Rubus trivialis).
2. HIGH-BUSH BLACKBERRY (Rubus nigrobaccus).
3. CLOUDBERRY (Rubus Chamæmorus).
4. FLOWERING RASPBERRY (Rubus odoratus).
5. RED RASPBERRY (Rubus strigosus).
6. BLACKCAP (Rubus occidentalis).

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made him a noble, receiving also the title of Imperial Russian State Councilor. In 1870 he was engaged to direct the Philharmonic and Choral societies of Vienna, after which he entered upon an extended tour of the principal countries of the world, in the course of which, and in company with the violin virtuoso Wieniawski, he visited America (1872). From 1887 to 1890 he was again director of the Saint Petersburg Conservatory. From 1890 to 1892 he lived principally in Berlin, and the next two years he spent in Dresden, after which he returned to Saint Petersburg, in which city he died. The lines of his greatest development were in a degree formulated by Liszt, and German thought and tendency influenced his virtuosity. He was of the Beethoven type, and curiously enough was not unlike that master physically; yet he differed from Beethoven in just such ideals and tendencies as made him naturally a worshiper of Chopin, and correspondingly distrustful of the music and school of Wagner. Among his greatest works may be mentioned the *Ocean Symphony, Dramatic Symphony,* and a sketch for grand orchestra, *Ivan the Terrible*, which have established his fame as a symphonist. Of his operas the following may be singled out: *Die Kinder der Haide* (1861); *Feramors, oder Lalla Rookh* (1863); *Nero* (1879); *Die Makkabäer* (1875); *Dimitri Donskoi* (1852); *The Demon* (1875). His oratorios include *Paradise Lost* (1875) and *The Tower of Babel.* Many of his songs are standard concert favorites, and with few exceptions his numerous compositions, chamber, salon, and concert, are strikingly beautiful, and possess every element of permanency. He also wrote *Die Musik und ihre Meister* (Leipzig, 1892) and *Gedankenkorb* (1897). He instituted the two Rubinstein prizes of 5000 francs each in playing and composition, open to all nationalities, competitions for which are held quinquennially in each of the following cities: Saint Petersburg, Berlin, Vienna, Paris. Consult: *Erinnerungen aus 50 Jahren, 1839-89* (Leipzig, 1893); MacArthur, *Life of Rubinstein* (London, 1889).

RUBINSTEIN, Nikolai (1835-81). A Russian composer, brother of Anton, born in Moscow. From 1844 to 1846 he was Kullak's pupil in pianoforte and Dehn's in composition, in Berlin. He founded the Moscow Musical Society in 1859. This society opened the Moscow Conservatory in 1864 and appointed Rubinstein director, which position he occupied until his death. Among his pieces are tarantellas, mazurkas, polkas, and valses. He died in Paris.

RUBLE (Russ. *rubli*, perhaps from *rubiti*, to cut off, or from Pers., Hind. *rūpiya*, rupee, from *rūpa*, silver, from Skt. *rūpa*, silver, wrought work, handsome, from *rūpa*, natural state, form, beauty). A Russian silver coin of the value of 100 kopecks, the unit of Russian coinage. Since the adoption of the gold standard in 1897 the value of the ruble has been fixed at 51 cents.

RUBRIC (Lat. *rubrica*, red earth, red ochre, red law-title, law, rubric, from *ruber*, red). A name applied to the directions for the conduct of divine worship found in various service books, so called because they were originally written, and are now frequently printed, in red ink, to distinguish them from the text of the prayers.

RUBUS (Lat., bramble). A genus of perennial herbs and often subligneous stemmed shrubs of the natural order Rosaceæ. The fruit is edible in all, or almost all, the numerous species, which are natives chiefly of the colder parts of the Northern Hemisphere. The raspberry and bramble, or blackberry, and cloudberry (qq.v.) belong to the genus; *Rubus spectabilis*, the salmonberry found in British Columbia and Southern Alaska, is a shrubby species, with large dark purple fragrant flowers. Its dark yellow or red, acid, somewhat astringent fruit is about the size of a blackberry, and is extensively used as a dessert and for pies, etc. *Rubus saxatilis*, sometimes called the stone bramble, is a perennial herb, with pleasant fruit of few rather large drupes. It is a native of stony places, in mountainous parts of Europe. *Rubus arcticus*, native to mountainous regions, is a small herb with rose-colored large flowers, and purplish-red exquisitely flavored fruit. *Rubus stellatus*, an Alaskan species known as 'Knesheneka' and 'morong,' has a similar fruit. The dewberries resemble and are closely related to the blackberries.

RUBY (OF. *rubi, rubis*, Fr. *rubis*, Sp. *rubi, rubin*, It. *rubino*, from ML. *rubinus, rubius, rubium*, ruby, from Lat. *rubens*, red, from *rubere*, to be red, from *ruber*, red). A red transparent variety of corundum much prized as a gem. The darker colors are wine red, carmine, or blood red, and most rubies have more or less of a blue or violet tint when viewed by transmitted light. The most valuable shade is the deep, clear, carmine red, commonly termed pigeon's-blood red. Others of poorer quality are of a lighter shade, or may contain white spots, which in some cases disappear on heating. Unlike other gems, the ruby can be heated to a high temperature without the red color being destroyed. Rubies are dichroic by transmitted light, and they possess the advantage of appearing equally brilliant by artificial or natural light. Rubies of large size are scarce and of high value, so that a 3-carat stone of proper color and free from flaws is worth several times as much as a diamond of the same size. Among the largest rubies may be mentioned two belonging to the King of Bishenpur, in India, which weighed 50¾ and 17½ carats respectively. The largest ruby known is one from Tibet weighing 2000 carats, but it is not of first quality. Rubies are found in many localities, but most of the occurrences are of little value. The celebrated pigeon's-blood stones are obtained from Mandalay, in Burma. The rubies are separated from the loose earth or 'byon' by washing. Small rubies, generally of pink color, are found at Ratnapura, in Ceylon, and others are obtained from Siam. They are also known to occur in Victoria and New South Wales, as well as in the Government of Perm, Russia. In the United States rubies have been found in stream gravels near Franklin, Macon County, N. C., from which they are extracted by washing. Those found in Arizona and other Western States are not true rubies, but a variety of garnet. The same is true of the so-called Cape rubies found with the diamonds in South Africa. Rubies have been made artificially up to ⅛ carat in size, and have been used as watch jewels. Consult Bauer, *Edelsteinkunde* (Leipzig, 1896).

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RUBY MINES. A district of Upper Burma, India. See MOGOK.

RUBYTHROAT. The humming-bird of the Northeastern United States. See HUMMING-BIRD.

RUBY WEDDING. See WEDDING ANNIVERSARIES.

RUCELLAI, rōō'chĕl-lä'ē, BERNARDO (1449-1514). An Italian scholar, born in Florence. He was ambassador of the Republic of Florence successively to the Court of Ferdinand, King of Naples, and to that of Charles VIII. of France. One of the most prominent members of the Platonic Academy, he opened his famous gardens, known as the *Orti Oricellarii*, in 1494, as the meeting-place of the organization. Rucellai was an excellent student of antiquity, and wrote in Latin two nameworthy works, *De Urbe Roma* and *De Bello Italico*, the former a topographical description, the latter a history of the struggle with Pisa and the expedition of Charles VIII. of France against Italy.

RUCELLAI, GIOVANNI (1475-1526). An Italian poet, born at Florence. He was appointed prothonotary apostolic and governor of the Castle of Sant' Angelo. His didactic poem *Le api* (1539; new ed. 1797) is an obvious imitation of the fourth book of the *Georgics*. In diction it belongs, says Symonds, "to the best period of polite Italian." It is among the earliest specimens in Italian literature of the *versi sciolti*, or unrhymed verse. Rucellai wrote also two tragedies, *Rosemunda* (1525) and *Oreste* (1726), the latter based on the *Iphigenia in Tauris* of Euripides and much superior to the former in style and dramatic skill.

RÜCKER, ṛuk'ĕr, Sir ARTHUR WILLIAM (1848—). An English scientist and educator. He was educated at Brasenose College, Oxford, was a fellow of the college in 1871-76, was also for a time demonstrator in the Clarendon laboratory of the university, and in 1874 became professor of mathematics and physics in the Yorkshire College of Leeds. From 1886 to 1901 he was professor of physics in the Royal College of Science, South Kensington, London, and in the latter year was appointed principal of the University of London. He was elected (1884) a fellow of the Royal Society, whose medal was awarded to him in 1891. In conjunction with Reinold he published a series of papers (*Transactions of the Royal Society*, 1880-92) on the properties of liquid films, and with Thorpe executed the magnetic surveys of England, Scotland, and Ireland, for 1886 and 1891, the results of which were published in 1890 and 1896 respectively as *Magnetic Surveys of the British Isles*. Further publications by him include a study *On the Expansion of Sea Water by Heat* (with Thorpe, 1876).

RÜCKERT, ṛuk'ĕrt, FRIEDRICH (1788-1866). A German poet, first known by his pseudonym "Freimund Raimar," born at Schweinfurt. He was educated at Würzburg and Heidelberg, and, after being a docent at Jena, taught in various places and in 1816-17 edited the *Morgenblatt* in Stuttgart. In 1826 he became professor of Oriental languages at Erlangen, went to Berlin in 1841 as Privy Councilor and professor, and in 1849 retired to his estate at Neusesz near Coburg, where he died. Rückert's first popularity was achieved by political poems, *Geharnischte Sonette* (1814), against Napoleon, but his lyrics are in the main philosophical and contemplative. The most popular collections are *Liebesfrühling* (1844) and *Die Weisheit des Brahmanen* (1836-39). He turned much Oriental literature into admirable verse, notably Hariri's *Abu Seid* (1826); Firdausi's *Rostem und Suhrab* (1838); *Amrilkais* (1843); *Hamasa* (1846); and a portion of the Indian Mahabharata, *Nal und Damajanti* (1828). He also adapted Theocritus, Aristophanes, Sadi's *Bustan*, and the Indian drama *Sakuntala* to German taste. These were published posthumously. Rückert, who had mastered many languages, is unsurpassed as a translator. His poems reflect with wonderful fidelity the Oriental spirit and the verbal felicities of the Oriental style. He wrote dramas, too, but they are inferior to his lyrics. Rückert's *Werke* were collected in 12 vols. (Frankfort, 1868-69), and have also been edited by Laistner (Stuttgart, 1895-96), Beyer (Leipzig, 1900), Stein (ib., 1897), Ellinger (ib., 1897), and Linke (Halle, 1897). For his biography, consult Fortlage (Frankfort, 1867), Beyer (ib., 1868), Suphan (Weimar, 1888), and Muncker (Bamberg, 1890).

RUCKSTUHL, rŭk'stōōl, FREDERICK WELLINGTON (1853—). An American sculptor, born at Breitenbach, in Alsace. His family went to Saint Louis when the boy was hardly a year old. He was educated in the city schools of Saint Louis and in Paris. His statue "Evening," which had honorable mention at the Salon in 1888, received a grand medal at the World's Fair in Chicago in 1893, and is now at the Metropolitan Museum in New York. Returning to Saint Louis, Ruckstuhl carved a statue of "Mercury Leading the Eagle of Jupiter," which is owned by that city, and the statue of "Solon" in the Congressional Library (Washington). Among his most successful works are the equestrian statue of General Hartranft in Harrisburg, Pa.; a portrait bust of John Russell Young; the Soldiers' and Sailors' Monument in Jamaica, Long Island. He directed the sculptural decoration of the Appellate Court House in New York.

RUDAGI, rōō'dä-gē', or **RUDAKI** (early part of the tenth century). The earliest of the great Persian poets. He was born at Samarkand, and according to legend was blind from his birth. He was not alone a poet, but a singer and a musician as well. Toward the end of his life he lost favor with his royal patron, the Samanid prince Nasr II., and died in poverty, probably about 945. A few fragments of his poems have been preserved, mostly in anthologies and lexicons. His most important work was a translation into Persian of an Arabic version of the Pahlavi rendering of Bidpai (q.v.). To judge from the fragments which survive, his style was simple and direct, comparatively free from the mannerisms and artificialities of later Persian poetry, while in religion he seems to show the influence of Sufism (q.v.). Consult: Ethé, "Rûdagî der Sâmanîdendichter," in *Nachrichten der Göttinger gelehrten Gesellschaft der Wissenschaften* (Göttingen, 1873); Browne, *Literary History of Persia* (New York, 1902).

RUDBECK, OLOF (1630-1702). A Swedish scientist, born in Westerås and educated at Upsala. There he studied natural science and at twenty-three discovered the lymphatic canal, winning thereby a European reputation. After

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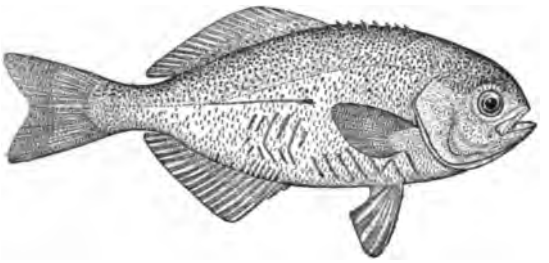
medical studies at Leyden, he became professor at Upsala (1655), and made himself famous by his knowledge of botany, physics, and mathematics, and of archæology. With his son Olof (1660-1740), he published a great botanical atlas, *Campus Elysius* (1701-02). But his especial fame is in the department of curious literature as the author of *Atland eller Manheim* (1675-98), in which he attempted to show that Sweden was the original garden of Eden and Plato's Atlantis.

RUDDER. See HELM; SHIP.

RUDDER-FISH (so called from its habit of following vessels). A general name applied to a family (Centrolophidæ) of fishes of the open seas, allied to the pompanos and harvest-fishes, which includes the blackruffs of the genus Centrolophus, and the 'black rudder-fish' (*Palinurichthys perciformis*), the latter with the oblong form shown, and blackish-green in color. They are about one foot long. These fish gather in schools off the coast of the Northeastern States and have the habit of sheltering themselves under anything floating, as a log, a barrel, or boat, where they find not only some protection, but food in the form of hydroids, small barnacles, and other growths. Hence the name 'log-fish,' often applied to them. They are good eating.



RUDDER-FISH (*Palinurichthys perciformis*).

Another rudder-fish is the large amber-fish (*Seriola zonata*) also called 'shark's pilot,' and common from Cape Cod to Cape Hatteras.

RUD'DIMAN, THOMAS (1674-c.1757). A distinguished Scottish scholar, born at Raggel, Parish of Boyndie, Banffshire, and educated at King's College, Aberdeen. He began his career as an editor by publishing an edition of Florence Wilson's *De Animi Tranquillitate Dialogus*, to which he prefixed a life of the author. In 1709 he published Arthur Johnstone's *Cantici Solomonis Paraphrasis Poetica*. In 1714 appeared his well-known work *Rudiments of the Latin Tongue*, a Latin grammar which at once superseded all others. In 1725-32 he published his *Grammaticæ Latinæ Institutiones*. As principal keeper of the Advocates' Library (1730), he published a magnificent edition of Anderson's *Diplomata et Numismata Scotiæ* (1 vol. folio). In 1751 he published an edition of Livy still known as the 'immaculate' edition from its entire exemption from errors of the press. Consult his *Life* by Chalmers (1794).

RUDDY (or RUDDER) **DUCK** (from AS. *rudu*, redness, from *rēodan*, to make red, from *rēad*, red). A small fresh-water duck, common throughout Northern North America, and visiting the southern part of the country in winter, noted among gunners for its skill in diving after the manner of grebes, and for the length of time it can remain under water. This duck (*Erismatura rubida*) has the bill slaty-blue; top of the head black; chin and sides of the head white; neck and upper parts bright chestnut; and the lower parts silky white. The female is duller in color.

RUDE, rud, FRANÇOIS (1784-1855). A French sculptor, born at Dijon. He studied in Paris at the Ecole des Beaux-Arts under Cartellier, received the Prix de Rome in 1812, and from 1815 to 1828 lived in Brussels. In the latter year he returned to Paris, and exhibited his statue of "Mercury Fastening His Sandal" (Louvre) in the Salon of that year. This was followed by his "Neapolitan Fisher-Boy" (1831, Louvre), the first of that short series of striking masterpieces which have placed him in the first rank of French sculptors. Rude was undoubtedly a classicist in a large way, but in the "Fisher-Boy" he shows himself quite capable of sympathizing with the Romantic School, then in its full vigor. From this time (1831) his work became increasingly naturalistic, evolving into thoroughly modern realistic art. In 1830 he was first employed in the decoration of the Arc de Triomphe de l'Etoile, for which Rude made designs for four great groups of sculpture at the base: "Le départ," "Le retour," "La défense," and "La paix." Thiers evidently intended at first to allow Rude to execute all four, but later gave two to Etex and one to Cortot, leaving only the "Départ" to Rude. This great group was finished in 1836. It represents the departure of the volunteers in 1792, and is, perhaps, the most powerful and perfect work in sculpture produced by the French nation.

Compared with the "Départ" the rest of his production is mediocre, except perhaps the superb mortuary figure of Godefroy Cavaignac (1847, Montmartre Cemetery). Other statues by Rude are a charming Louis XIII. (1842) as a boy; "Awakening to Immortality;" "Maréchal de Saxe" (1838); "Napoleon" (1847); "Christ on the Cross" and "Joan of Arc" (1852, both in the Louvre); "Maréchal Ney at Paris" (1853); "Hebe and the Eagle" and "Amor Victor," in the Museum of Dijon. The most complete biography of Rude is by Fourcaud in the *Gazette des Beaux-Arts* (1888-91). See also Bertrand, *François Rude* (Paris, 1888); and Rosenberg, in Dohme, *Kunst und Künstler des neunzehnten Jahrhunderts* (Leipzig, 1886).

RU'DENS (Lat., Cable). A romantic comedy by Plautus, the plot of which, taken from Diphilus, preserves much of the Greek atmosphere. The scene is laid near the African Cyrene. Shakespeare borrowed from the play in *Pericles, Prince of Tyre*.

RUDERAL PLANTS (from Lat. *rudus*, rubbish). Plants of roadsides and waste places. Close observation of ruderal areas shows that there is a rapid order of succession of the plant forms, commencing with annuals, largely because of the quick germination of their abundant seed. Then grasses and other perennial plants gradually crowd out the annuals, a change sometimes accomplished within ten years. Naturalized plants (see NATURALIZATION) frequently gain foothold in ruderal areas, doubtless because the

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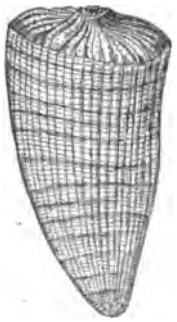
struggle is here somewhat less severe than in older and more established plant societies.

RÜDESHEIM, rụ'des-hīm. A town in the Province of Hesse-Nassau, Prussia, on the right bank of the Rhine, opposite Bingen (Map: Prussia, B 3). It is celebrated for its wine of the same name, the oldest brand of the Rhine wines. Population, in 1900, 4812.

RÜDINGER, rụ'dĭng-ẽr, NIKOLAUS (1832-96). A German anatomist, born in Büdesheim, and educated at Heidelberg and Giessen. He was appointed professor of anatomy at Munich in 1870. He was a pioneer in the use of photography in anatomic instruction. He published an *Atlas des peripherischen Nervensystems* (1861-65), an *Atlas des menschlichen Gehörorgans* (1866-75), *Topographisch-chirurgische Anatomie* (1872-79), and *Kursus der topographischen Anatomie* (1891).

RUDINI, rōō-dē'nê, ANTONIO STARRABBA DI, Marquis (1839—). An Italian statesman, born in Palermo. At the age of twenty-seven he was chosen Mayor of Palermo, and distinguished himself by suppressing an insurrection. In 1869 he was for a short time Minister of the Interior. Subsequently he was a member of the Chamber of Deputies until February 7, 1891, when he became Prime Minister, having as leader of the old Right made an alliance with the Radical leader Nicotera to overthrow Crispi (q.v.). During his administration occurred the diplomatic tension with the United States over the killing of seven Italians by a New Orleans mob. His general policy differed from that of his predecessor in its more conciliatory attitude toward France. He gave way to Giolitti in May, 1892, but after the Abyssinian disaster he was in 1896 recalled to the head of the Ministry. His Government went down in the disturbed Italian politics of 1898.

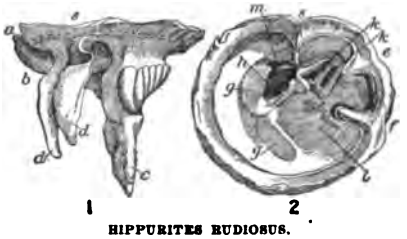
RUDISTÆ (Neo-Lat. nom. pl., from Lat. *rudis*, rough). A group of fossil marine lamellibranchs characterized by the great conical elongation of the right valve, which was attached to the sea bottom by its apex, and by the reduc-



HIPPURITES GOSAVIENSIS.

HIPPURITES CORNU-VACCINUM.

tion of the left valve to the condition of a lid-like operculum in which no trace of the original spiral form of the shell remains. The Rudistæ occur in great abundance in some portions of the Middle and Upper Cretaceous of Europe, Asia Minor, and Central America. The hinge of the shell has been entirely changed from its original form and now consists of a system of pegs on the upper valve, which fit into sockets in the lower valve, and which permit the operculum to be raised and lowered in a vertical motion instead of in a rotary motion, as in the normal pelecypod. The principal genera are Radiolites, Hippurites, Sphærolites, and a large



HIPPURITES RUDIOSUS.

1, Upper valve; *s*, sinus of the hinge; *a*, *b*, grooves corresponding to anterior and posterior columns of the lower valve; *c*, anterior process of the clithrum; *d*, *d*, posterior processes of the clithrum. 2, Interior of lower valve seen from above; *e*, *f*, position of anterior and posterior columns; *gg*, adductor scars; *h*, socket of anterior, and *kk* of posterior processes of clithrum; *l*, body-chamber of cell; *m*, vacant cavity near sinus.

form, Barrettia, which attains a length of two feet. These most curious of pelecypods resemble corals so closely that they were formerly classed as such. Consult Bernard, *Eléments de paléontologie* (Paris, 1895).

RU'DOLF, LAKE. A large lake in British East Africa situated 200 miles northeast of the Victoria Nyanza (Map: Africa, H 4). It lies in the Great Rift Valley and is of elongated shape, about 185 miles long from north to south and 20 to 35 miles wide. It is bordered by high cliffs in the south; elsewhere the surrounding country consists either of rugged lava fields or sandy plains, and is treeless and sterile. Several active volcanoes stand close to the shores, whose contour is said to have been changed in recent years by volcanic activity. The lake is deep near the southern end and shallow in the north, where the Omo or Nianam River enters it through a marshy delta. As there is no outlet, the water is brackish. The lake was discovered by Teleki in 1888.

RUDOLF OF EMS (?-1254). A German poet, born probably in Switzerland, and getting his name from Hohenems. He died in Italy in the service of Conrad IV. Rudolf's earliest work was *Der gute Gerhard*. More famous was the story of *Barlaam und Josaphat* (c.1225; edited by Pfeiffer, Leipzig, 1843). He also wrote a *Weltchronik*, based for the most part on the Old Testament and coming down only to the death of Solomon. In a revised form it had a great vogue up to the time of Luther's version of the Bible, being practically the only form in which the earlier part of the biblical story was available for the common people.

RUDOLPH I. (1218-91). King of Germany and head of the Holy Roman Empire from 1273 to 1291, founder of the present House of Austria. He was the son of Albert IV., Count of Hapsburg and Landgrave of Alsace. Through inheritance, through his marriage with Gertrude, Countess of Hohenberg, and by successful wars with his neighbors, he became the most powerful prince in the extreme southwest of Germany, with possessions in Switzerland, Swabia, and Alsace. He acquired a great reputation for brav-

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ery, wisdom, and fair dealing. During the Great Interregnum, which began in 1256, Germany was without an acknowledged head. In 1272 Pope Gregory X., alarmed at German disunion, used every means in his power to force an Imperial election. The great Rhenish princes, in whose hands rested the power of election, wished to find someone who would not be unmanageable or strong enough to excite jealousy. Their choice fell on Rudolph of Hapsburg, and he was crowned at Aix-la-Chapelle, October 24, 1273. Rudolph's most formidable opponent was Ottokar, King of Bohemia, who refused allegiance to the new King. Rudolph made war upon him, vanquished him, and forced him to give up the duchies of Austria, Styria, and Carinthia, and some other territories (1276).

Ottokar, having renewed the war, was defeated and slain in a battle on the Marchfeld (1278). The Emperor, in 1282, invested his sons, Albert and Rudolph, with the territories wrested from Ottokar. (See AUSTRIA-HUNGARY.) Rudolph did a great service to Germany in suppressing the 'robber barons' and destroying their strongholds. He is said to have condemned to death thirty nobles and to have razed to the ground twice that number of castles. His efforts to preserve peace, by prohibiting private wars, were very acceptable to the towns and lesser nobles, but the lack of effective police and judicial organizations prevented the execution of his laws. Moreover, he antagonized the towns by attempting to raise an Imperial revenue by taxation. Consult: Kopp, *König Rudolf und seine Zeit* (Leipzig, 1845-49), continued by Busson (Berlin, 1871); Hien, *Rudolf von Habsburg* (Vienna, 1874); Schulte, *Geschichte der Habsburger* (Innsbruck, 1887); Zisterer, *Gregor X. und Rudolf von Habsburg* (Freiburg, 1891); and Redlich, *Rudolf von Habsburg* (Innsbruck, 1903).

RUDOLPH II. (1552-1612). Holy Roman Emperor from 1576 to 1612. He was the eldest son of the Emperor Maximilian II., and was educated in the Spanish Court by the Jesuits. On the death of his father, in 1576, he succeeded to the Imperial crown and to the possession of the Archduchy of Austria, Bohemia, and part of Hungary. He was weak-willed and little concerned with the affairs of government, which he left in the hands of the leaders of the Counter-Reformation. The liberalizing tendencies which had been at work in the Austrian dominions under his predecessor came to an end. Intolerance and persecution on the part of Rudolph aroused bitter discontent and in 1604 an insurrection broke out in Hungary. Matthias, the younger brother of Rudolph, put himself at the head of a formidable party against the Emperor, and in 1608 forced him to cede to him the government of Austria, Hungary, and Moravia. In 1609 Rudolph was forced to issue the Majestätsbrief, guaranteeing the Bohemians religious freedom, but at the same time preparations were already going on for the great struggle that was to break out in less than a decade. In 1608 the Evangelical Union was formed by some of the German States for the defense of the Protestant religion, and this was followed by the organization of the Catholic League in 1609. In 1611 Bohemia was taken from Rudolph and transferred to Matthias. The Emperor died January 20, 1612, without issue, and was succeeded by Matthias. Rudolph's taste for astrology and the occult sciences, and his desire to discover the philosopher's stone, led him to extend his patronage to Tycho Brahe and Kepler. The important astronomical calculations begun by Tycho and continued by Kepler, which are known as *The Rudolphine Tables*, derive their name from this Emperor. Consult Gindely, *Rudolph II. und seine Zeit* (Prague, 1863-65).

RUDOLPH (1858-89). An Archduke and Crown Prince of Austria, son of Francis Joseph I. He was educated carefully and entered the army in 1878. He was an enthusiastic hunter and traveler, and the author of *Fünfzehn Tage auf der Donau* (1881), and *Eine Orientreise* (1884). He planned and partly edited the work *Die österreichisch-ungarische Monarchie* (1886 et seq.). Rudolph married Stephanie, daughter of Leopold II. of Belgium, in 1881. The Archduke was found dead in his shooting lodge at Meyerling, near Baden.

RUDOLSTADT, rōō'dôl-stät. The capital of the Principality of Schwarzburg-Rudolstadt, Germany, on the Saale, 18 miles south of Weimar (Map: Germany, D 3). Its most beautiful church is the thirteenth-century Stadtkirche, rebuilt in the seventeenth century, and restored in 1879. The castle has been the residence of the Prince since 1599. The city has a palace with a natural history collection, a gymnasium, a national seminary, and a library of 65,000 volumes. It manufactures porcelain, pianos, metal and wooden artistic cabinet work, children's building-blocks, chocolate, essential oils, and chemicals. Rudolstadt is first mentioned in the year 800. It came into possession of Schwarzburg in 1355. Population, in 1900, 12,407.

RUDRA, rōō'drȧ (Skt., howler, or perhaps, red, bright), or MAHADEVA. A deity of Vedic India. He is described as an archer bearing the lightning shaft, and in personal appearance he is of dazzling brilliancy. He is either copper-colored or with a black belly and a red back, while his neck is blue and his eyes are a thousand in number. He is associated most frequently with the Maruts (q.v.), although in some passages he is identified with Agni (q.v.), or with Vishnu (q.v.). His character is twofold. For the most part he is represented as a terrible deity, mighty, and dangerous, to whom prayer must be offered to induce him to avert his shafts both from men and from animals, occasionally even from the gods, while disgraceful attributes are assigned to him in the later Vedic period. On the other hand, Rudra is a divinity of healing, and his blessings are besought repeatedly. In the post-Vedic period the place of Rudra in the Hindu pantheon has been usurped by Siva (q.v.). Consult: Muir, *Original Sanskrit Texts* (London, 1868-74); Macdonell, *Vedic Mythology* (Strassburg, 1897).

RUE (OF., Fr. *rue*, from Lat. *ruta*, from Gk. *ῥύτη*, *rhutē*, rue), *Ruta*. A genus of about 50 species of half shrubby plants of the natural order Rutaceæ, natives of Southern Europe, Northern Africa, the Canary Isles, and the temperate parts of Asia. Common rue or garden rue (*Ruta graveolens*) grows in sunny stony places in Mediterranean countries and is cultivated in American gardens. It has greenish-yellow flowers, and glaucous evergreen leaves with small

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oblong leaflets, the terminal leaflets obovate. It was formerly called herb of grace (see *Hamlet*, act iv., scene 5), because it was used for sprinkling the people with holy water. It was in great repute as an amulet against witchcraft in the

RUE (*Ruta graveolens*).

time of Aristotle. The smell of rue when fresh is strong, and to many disagreeable; yet it is used in some parts of Europe in cookery. Some of the species found in Northern India are similarly used.

RUE CROWN. A Saxon order founded in 1807 by Frederick Augustus I., and intended as a distinction for high State officials. The cross is green, with white edges, and has golden rue leaves between the arms. The medallion is surrounded by a wreath composed of sixteen rue leaves and bears the initials of the founder, with the motto *Providentiæ Memor*.

RUEDA, rōō-ā'dȧ, LOPE DE (?-c.1567). A Spanish dramatist, born in Seville, where he was a gold-beater for some time. It seems probable that he was a versatile actor and manager of his troupe. He was the first popular dramatist of Spain. His works include four 'comedies,' mostly from Italian sources, where there is much pleasant fooling and a plot usually hinging on mistaken identity. Rueda also wrote bucolic dialogues, which are somewhat stiff, and ten *Pasos*, all drawn from every-day characters. His complete works are published in volumes 23 and 24 of the *Colección de libros españoles raros ó curiosos* (1895-96).

RUELLIA (Neo-Lat., named in honor of Jean *Ruel*, a French botanist of the sixteenth century). A large genus of plants of the natural order Acanthaceæ, mostly natives of tropical and subtropical Asia and Australia. Some beautiful species are cultivated for ornament in hot-houses. In Assam and in some parts of China *Ruellia indigofera*, called by some botanists *Strobilanthes flaccidifolius*, is much cultivated for the excellent indigo which it yields. A few species, especially *Ruellia strepens* and *Ruellia ciliosa*, with large blue or purple attractive flowers, are natives of the United States.

RUFF, or **REEVE** (probably from *ruff*, abbreviation of *ruffle*, from MDutch *ruyffelen*, to wrinkle; so called because of the neck-ruff). A European snipe (*Machetes pugnax*) noted for pugnacity. It is about a foot in entire length, and in color ash-brown, spotted or mottled with black; the head, a prominent erectile ruff of neck feathers, and the shoulders are black, glossed with purple, and variously barred with chestnut. The female (the reeve) is mostly ash-brown, with spots of dark brown, is much more uniform in color than the male, and lacks the ruff. See Colored Plate of SHORE BIRDS.

RUFFED GROUSE. See GROUSE.

RUF'FIN, EDMUND (1794-1865). An American agriculturist, born in Prince George County, Va. He attended William and Mary College from 1810 until 1812, and then, on the outbreak of war with England, enlisted in a volunteer company. After scarcely six months' service, however, he returned to the estate left him by his father and thenceforth devoted himself to agriculture. He made a number of experiments which resulted in the discovery of the value as a fertilizer of the great deposits of marl in Eastern Virginia. In 1833 he founded the *Farmer's Register*, a pioneer in arousing interest in scientific farming. In 1842 he was appointed agricultural surveyor of South Carolina, and later he founded the Virginia State Agricultural Society, of which he became president. As the oldest member of one of the military organizations which besieged Fort Sumter, he fired the first shot of the war at half past four o'clock, Friday morning, April 12, 1861. Four years later when the conflict ended he committed suicide rather than give his allegiance to the United States. Consult *Yearbook of the United States Department of Agriculture* (1875).

RUELLIA (*Ruellia ciliosa*).

RUFFINI, rụf-fē'nê, GIOVANNI (1807-81). An English writer of Italian origin, born in Genoa. He studied in his native city and came to know Mazzini, whose "Young Italy" (q.v.) he joined in 1833. He fled from Italy, and from 1836 to 1842 lived in England. He then went to France. The revolutionary movement of 1848 permitted his return to his native land, and he entered the Sardinian Parliament in that year, becoming in 1849 Sardinian representative at Paris. After the battle of Novara he returned to England and devoted himself to the writing of novels. He published *Doctor Antonio* (1855), *Dear Experience* (1878), *Lavinia* (1860), *Vin-*

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cenzo (1863), and other works. His autobiography appeared in 1853 under the title *Passages in the Life of an Italian.*

RUF'FO, FABRIZIO (1744-1827). An Italian cardinal and general. He was born in Calabria, a descendant of the ducal family of Barnello, and was trained as a priest. In 1794 he was made cardinal. He entered afterwards the Neapolitan service, and offered stubborn and successful resistance to Championnet, who, at the head of a French army, attempted to capture Naples. Having gathered a large number of royalists in Calabria, with the aid of the celebrated brigand chief Fra Diavolo (q.v.), he expelled the French and the republicans from the country and restored King Ferdiand I. to the throne in 1799.

RUFIJI, rōō-fē'jē. The principal river in German East Africa. It is formed by the junction of the Luvegu and Ulanga and flows northeastward and then eastward, entering the Indian Ocean through a large delta 120 miles south of Zanzibar. The headstreams rise on the Livingstone Mountains northeast of Lake Nyassa, and flow through a sparsely inhabited forest country. Some distance below the confluence the Rufiji receives the Ruaha, which rises north of Lake Nyassa, and exceeds the main stream in length. The Rufiji is navigable for small steamers up to the falls below the confluence of its headstreams, above which the Ulanga is again permanently navigable for the greater part of its course.

RUG'BY. A market town in Warwickshire, England, 15 miles northeast of Warwick (Map: England, E 4). It is an important junction of five different railways. It derives its celebrity from Rugby School (q.v.), founded in 1567. Population, in 1901, 16,830. Consult: Bloxham and Smith, *Rugby: Its School and Neighborhood* (London, 1889); Rimmer, *Rambles Around Rugby* (ib., 1882).

RUGBY. A town in Morgan County, Tennessee, 7 miles from Rugby station on the Cincinnati Southern Railroad, and 114 miles north of Chattanooga. The town was founded in the expectation of developing an ideal community. The first steps were taken by New England capitalists, who soon transferred the enterprise to an English company, which invested £150,000 in a tract of 50,000 acres and improvements. The site was ready in 1880, and a colony of English farmers took possession. The plan contemplated a combination of industrial activity with attention to culture and out-of-door English sports, such as cricket and hunting, and it was expected that the colony would consist of both American families and the sons of English farmers of the better class in fair circumstances. It was, however, never successful, and after a few years the distinctive features of the colony were abandoned. The town is now a popular health resort.

RUGBY SCHOOL. A famous public school, situated at Rugby, England, founded in 1567 under the will of Lawrence Sheriffe as a free school for the children of Rugby and Brownsover. Edward Rolston was appointed the first master in 1574. Up to 1667 the school remained in comparative obscurity. Its history during that trying period is characterized mainly by a series of lawsuits between descendants of the founder, who tried to defeat the intentions of the testator, and the masters and trustees, who tried to carry them out. A final decision was handed down in 1667, confirming the findings of a commission in favor of the trust, and henceforth the school maintained a steady growth. Under the vigorous administration of Francis Holyoake, headmaster from 1688 to 1731, Rugby assumed considerable importance among English public schools, there being at one time an enrollment of more than 100 pupils. Thomas James, an Etonian by education, was elected headmaster in 1778. He was an accomplished scholar in classics and mathematics, and a firm disciplinarian. He introduced exhibitions, forms, tutors, 'præpostors,' and fags, and in general all the methods in vogue at Eton. At the end of his régime (1794) the attendance was about 200. James was the first real organizer of Rugby as we find it to-day.

The choice of Thomas Arnold (q.v.) in 1829 as headmaster of Rugby marks the beginning of a new spirit in English education. The aim hitherto had been the inculcation of knowledge with a view to preparation for university examinations. Arnold conceived the idea of education that makes for character. He sagaciously accepted the organization of Rugby as he found it, but he infused new life and light into it. He did not abrogate the liberty of the older boys, but he added to it responsibility by placing the discipline of the school in the hands of the sixth form. The unhappy lot of fags was under his influence considerably ameliorated. Since his death in 1842 the successive masters have with more or less success striven to maintain the high standard set up by Arnold. In 1868 the government of the school was transferred to a board of governors, the board of trustees retaining management of the finances and the appointing of masters. The lower school was established in 1878 for foundationers, Rugby School proper being devoted to the education of non-foundationers. The studies at Rugby are still mainly classical. The modern tendencies are, however, fast making an inroad into the school curriculum. There are 14 competitive scholarships, ranging from £20 to £100 annually. In 1900 Rugby had an attendance of about 600, distributed among the classical, specialist, and modern 'sides' and the army class. The principal buildings are the Rugby and New Big Schools, built in quadrangles; the chapel, the gymnasium, and the museum. In 1900 there were 9 dormitories. The 'Close' is the principal playground and contains about 17 acres, the most popular game being football. Rugby includes also a library, a laboratory, a vivarium, and a workshop. Two missions, one home and one foreign, are supported by Rugbeians. *The Meteor* is the principal publication. By far the best known of English public schools, Rugby owes its celebrity in part to the truthful picture of the school life of real boys as drawn by one of her sons, Thomas Hughes, in his classic *Tom Brown at Rugby.*

RUGE, rōō'ge, ARNOLD (1802-80). A German political agitator and miscellaneous writer, born at Bergen, island of Rügen. He studied at Jena and Halle, shared in the student agitations of 1821-24, was imprisoned (1824-30), became privat-docent at Halle (1832), founded the *Hallesche Jahrbücher* (1837), as an organ of the Young German Hegelians, and, on its suppression by the

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Prussian censorship, he went to Paris (1843-45), and later to Switzerland. He then became a bookseller in Leipzig, published a democratic journal, *Die Reform*, was elected to the Frankfort Parliament (1848), and in the next year he fled to England. He aided Mazzini and Ledru-Rollin in organizing the Central European Democratic Committee (1849), and, from 1852, lived in Brighton, teaching and writing. He wrote, among other things, a *Manifest an die deutsche Nation* (1866), and *Geschichte unserer Zeit* (1881). In 1877 he was pensioned by the German Government. His autobiography *Aus früherer Zeit*, appeared in Berlin, 1863-67; his *Letters* were edited by Nerrlich (ib., 1885-86).

RÜGEN, rȳ'gen. The largest of the islands of Germany, situated in the Baltic Sea off the coast of Pomerania, from which it is separated by the Strelasund, one mile wide (Map: Germany, E 1). It is 33 miles long from north to south, and 26 miles wide, and has an area of 362 square miles. It is of extremely irregular shape, the northeastern portion being separated from the remainder by a deep and irregular inlet known as the Jasmunder Bodden. It is level in the west and hilly in the east, nearly the whole eastern coast consisting of steep chalk cliffs rising in one place to a height of 528 feet. The scenery is pleasing, and, together with the good sea-bathing, attracts many visitors. The soil is fertile, producing grain and rape-seed; cattle-raising and herring fisheries are also important. Population, in 1900, 46,270. The chief town is Bergen. Rügen was taken possession of by Valdemar I. of Denmark in 1168, and was united with Pomerania in 1325. In 1648 it passed to Sweden, and in 1815 was acquired by Prussia, to which it still belongs.

RU'GENDAS, Georg Philipp (1666-1742). A German battle and military genre painter and engraver, born at Augsburg. He was a pupil of Isaac (or Jacob) Fischer, an historical painter, took Bourguignon, Lembke, and Tempesta for his models, but formed his style more especially through the study of the various phases of the military profession, from real life. He continued his studies for two years in Vienna, and in 1692 under Molinari in Venice, thence went to Rome. During the siege and pillage of Augsburg in 1703 he exposed himself to great danger by drawing, in the midst of the engagements, the scenes around him. The six etchings resulting from this are perhaps the most meritorious part of his work. His oil paintings, spirited in drawing, but defective in coloring, may best be studied in the Brunswick Gallery, which contains nine battle-pieces by him. Consult the monograph by Count Stillfried (Berlin, 1879).

RUGER, rōō'gēr, Thomas Howard (1833—). An American soldier, born at Lima, N. Y. He graduated at West Point in 1854, and was assigned to the engineers, but resigned a year later and became a lawyer at Janesville, Wis. On the outbreak of the Civil War he reëntered the service as lieutenant-colonel of the Third Wisconsin Volunteers, and during the first half of the war participated in the campaigns in Virginia, Maryland, and Pennsylvania, becoming brigadier-general of volunteers in November, 1862. In 1864 he commanded a brigade of the Twentieth Corps during the invasion of Georgia, and later commanded a division of the Twenty-third Corps in the Tennessee campaign against Gen. John B. Hood (q.v.), and for his gallantry at the battle of Franklin received the brevet rank of major-general of volunteers. Later he took part in the operations in North Carolina. After the war he was commissioned colonel of the Thirty-third Infantry, in July, 1866, and in 1871 was appointed superintendent of the United States Military Academy, where he remained until 1876. He was promoted to be brigadier-general in March, 1886, and to be major-general in February, 1895, and was retired from the service in May, 1897.

RUGGLES, Samuel Bulkley (1800-80). An American lawyer, born in Connecticut. He graduated at Yale in 1814, and was admitted to the New York bar in 1821. In 1838 he was elected a member of the State Legislature. In 1839 he was chosen as a canal commissioner, and the following year became president of the canal board, an office which he held again in 1858. He represented the United States in the international monetary conference in Paris, and was a delegate to the statistical conference at The Hague in 1869. As a member of the New York Chamber of Commerce he collected valuable statistics concerning production and transportation.

RUGGLES, rŭg'g'lz, Timothy (1711-95). An American jurist and soldier, born at Rochester, Mass. He graduated at Harvard in 1732, studied law, and in time became one of the foremost lawyers of the colony. He was made a judge of the Court of Common Pleas for Worcester County in 1757, and five years later became its Chief Justice. For many years he was a member of the General Court. When the French and Indian War began he entered the army, was second in command at the battle of Lake George in 1755, was made a brigadier-general, and in 1759-60 took part under General Amherst in the conquest of Canada. As a reward for his services he was given a farm by Massachusetts, and later was appointed to the office of surveyor-general of the King's forests. In 1765 he was president of the Stamp Act Congress, but, having refused to transmit to England the addresses and petitions drawn up by that body, he was censured by the Massachusetts General Court and reprimanded by the Speaker. In 1774 he received an appointment as mandamus counselor, and as he expressed his intention to serve, became so unpopular that he was forced to seek safety in Boston. When the British were forced to evacuate that city, he accompanied them, and ultimately settled in Nova Scotia, where he died. Consult: Washburn, *Sketches of the Judicial History of Massachusetts from 1630 to the Revolution in 1775* (Boston, 1840); and Paige, *History of Hardwick* (Boston, 1893).

RUGS (from Swed. *rugg*, rough tangled hair; probably connected with LGer. *rug*, OHG. *rūh*, *Ger. rauh*, AS. *rūh*, *rūg*, Eng. *rough*, and with Lith. *raukas*, fold, wrinkle). Floor coverings made in one piece, covering usually only a portion of the floor. A rug may be woven or it may be made from an animal's skin. Oriental rugs are sometimes used for hangings as well as for floor coverings. The ordinary power-loom rugs of Europe and America differ from carpets in their shape and size, rather than in the method of their manufacture. A *Smyrna* rug is simply a chenille Axminster (see Carpets), with the wool on both

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CAUCASIAN
CABISTAN

TURKISH
ANTIQUE GHIORDES

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PUNJAB INDIA
BEECHAPORE DESIGN

JULIUS BIEN & CO. LITH. N.Y.

PERSIAN OR IRAN
FERRAHAN, HERATI DESIGN

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sides instead of one. They were first manufactured in Glasgow, in hit or miss and mottled patterns, from the waste chenille of carpet manufacture. They were introduced about 1880 into America, where, in place of a mottled design, the patterns were copied from Oriental rugs and the goods were given their name of Smyrnas.

MOSAIC WOOL rugs are made of variously colored woolen threads, arranged so the ends form a pattern. These threads, about 17 feet long, are stretched firmly in iron frames, in a dense mass. To convert the threads into separate rugs, with the pattern on each, the upper surface, composed of the ends of the threads, is cemented onto a canvas backing. When dry, the threads are cut across by a very keen circular cutter, leaving a horizontal slice about $\frac{1}{16}$ of an inch thick adhering to the backing. This slice, when turned up, presents the original design in a soft nap of woolen threads. The process is repeated until the whole mass is transversely cut up and forms about a thousand rugs.

ORIENTAL is a general term for the hand-made rugs which are woven by the peasants of Western Asia, particularly of Turkey, Persia, Daghestan, and India. Their designs are chiefly geometrical figures or conventionalized flowers. This is due to the fact that the weavers are Mohammedans, whose religion forbids the representation of the forms of human beings or of animals. The colors most used and most durable are the blues, reds, and yellows. Formerly only animal and vegetable dyes were used, producing colors of wonderful softness and durability. The advent of aniline dyes has greatly deteriorated the permanency and beauty of Oriental colorings. In Persia the Government has forbidden their importation and confiscates all brought into the country.

The loom used for the weaving of an Oriental rug consists of a crude frame of poles and tree trunks. The threads of wool which form the pattern are attached to the warp by a running knot, and a weft thread is woven in at the back. The different names which Oriental rugs bear are usually derived from the district in which they are woven. Formerly each district had its own peculiar patterns and coloring, so that it was easy to identify a rug at a glance. But since rugs have been made so extensively for the Western markets it is not so easy to determine the make.

In general Turkish rugs are loosely woven of coarse yarn, with a long, thick pile. Among the most common varieties are the Carabagh, Syrian, and Daghestan, the Anatolian, and the Bokhara. Of the Indian rugs the Candahars and Agras are perhaps the most beautiful. The Persian rugs are the handsomest Oriental rugs produced. They are fine, closely woven, with a short pile. Camel's hair is much used in their manufacture. The Hamadan, Kirman, Shirvan, Teheran, Khorassan, Herat, and Kurdistan are well-known varieties.

The jute rugs of China and Japan are not durable in color or texture and are among the cheapest and also the most unsatisfactory of floor coverings.

Consult Mumford, *Oriental Rugs* (New York, 1900); *History and Manufacture of Floor Coverings* (New York, 1899).

RÜHMKORFF, rụm'kôrf, HEINRICH DANIEL (1803-77). A German physicist and instrument maker, born at Hanover. In 1848 he founded at Paris an establishment for the manufacture of instruments and scientific apparatus, devoting himself especially to the construction of electrical and magnetic instruments. His name is associated with a special form of induction coil which he invented in 1851. In 1864 he was awarded a grand prize of 50,000 francs for his applications of electricity.

RUHNKEN, rōōn'ken, DAVID (1723-98). A German classical philologist. He was born at Stolpe, Pomerania, and studied at Wittenberg and Leyden. He prepared a new edition of Plato, collected the scholia of that author, and published an excellent edition of Timæus's *Lexicon Vocum Platonicarum* (1754; reëdited in a much improved form 1789). In 1761 he was appointed to the chair of eloquence and history at Leyden. Ruhnken's chief service was in establishing university instruction in Greek throughout the Netherlands upon the same basis as that in Latin. There are three collections of his letters, and his life has been written by his famous pupil Wyttenbach (Leyden, 1799; last ed. Freiburg, 1846).

RUHR, rōōr. A river of Western Prussia, entering the Rhine near Duisburg, after a course of 145 miles through an important industrial and mining region (Map: Germany, B 3). By means of 10 locks it has been made navigable 46 miles.

RUHRORT, rōō'rôrt. A town in the Rhine Province, Prussia, at the junction of the Ruhr and the Rhine, 12 miles west of Essen (Map: Prussia, B 3). It has the largest river harbor in Europe, and possesses immense ship-building docks. It is the seat of a great coal trade. The manufactures include machinery and tin and iron ware. Population, in 1900, 12,407.

RUIPÉREZ, rōō-ē-pā'rāth, LUIS (c.1832-67). A Spanish genre painter, born at Murcia. After frequenting the academy of Barcelona, under Claudio Lorenzale (1814-89), and that of Madrid, he studied in Paris under Meissonier and became one of the most successful imitators of that master's style. The delicate and spirited touch of his pictures attracted much attention at the various exhibitions in Paris and London, and the best of them found a ready sale in France and England. Among these may be mentioned: "A Novice of the Order of St. Francis" (1859, medal at Paris); "The Card Players" (1862); "A Philosopher"; "Scene from Gil Blas" (1864, medal at Madrid); "Orange Vender"; "Fencing Lesson"; "A Violinist" (1867, great gold medal at Valencia).

RUISDAEL. See RUYSDAEL.

RUIZ, rōō-ēth', JUAN (?-c.1351). A Spanish poet, more commonly known as the Archpriest of Hita. Between 1337 and 1350 he was imprisoned by order of the Archbishop of Toledo, Gil de Albornoz. There he wrote most of his poetry, which, under the title of *Libro de buen amor*, is prefaced by a prose apologue urging the moral purpose of the work. The book involves a strange mixture of devotion, satire, humor, and bold attacks on the corruption of the Church, and includes an unusual collection of fables, legends, and amorous stories.

RUKWA, rōōk'vä. A lake of German East Africa. See RIKWA.

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RULE BRITANNIA. One of the national anthems of Great Britain. Its original appearance was in a mask entitled *Alfred*, the words by James Thomson and David Mallet, the music by Dr. Arne. It was first performed in 1740. The composer afterwards changed the mask into an opera (1745). Beethoven wrote five variations on the theme of "Rule Britannia." The words were certainly written by Thomson, though claimed by Mallet. Lord Bolingbroke wrote three additional but unsuccessful verses.

RULED SURFACES. See SURFACE.

RULE NISI (Lat., unless). In English practice, a rule or order that the thing applied for be granted, *unless* the person against whom the relief is asked, upon being served with a copy thereof, shows *cause* on a certain date why the rule should not be made *absolute*, or final. The word 'rule' is used in the sense of 'order.' The English practice acts now confine the use of this form of an order to cases where the court has summary jurisdiction. A *rule nisi* is obtained on an *ex parte* application. See MOTION.

RULE OF FAITH. One of several names given in the ancient Church to the statements of belief which constituted the standard of orthodoxy against prevalent errors, and which were solemnly committed to catechumens at their baptism. Other designations were Rule of Truth, Canon of Truth, Ecclesiastical Canon, etc. With slight variations they were current from the latter part of the second century onward, in Rome, North Africa, Gaul, Asia Minor, and Alexandria. The Rule of Faith was regarded as of Apostolic origin, being based upon the baptismal confession, or perhaps in some cases, like the baptismal confession itself, directly upon the formula of baptism (cf. Matt. xxviii. 19, and *Didache* 7). This statement of belief in the Father, Son, and Holy Spirit received short additions, mostly of a descriptive nature, and served the purpose of a creed, in the later sense. After the fourth century the Nicene Creed gradually displaced the earlier and shorter formulas, especially in the Eastern Church. Since the sixteenth century a new interpretation of the phrase 'Rule of Faith' has come into use among Protestants, according to which it means the Scriptures, as the sole authority in religion. This is asserted by them against the Roman Catholic appeal to the concurrent authority of Church, Scripture, and tradition. These two applications of the term should be carefully distinguished. On the various forms of the *Regula*, consult: Hahn, *Bibliothek der Symbole* (3d ed., Breslau, 1897); Schaff, *Creeds of Christendom* (New York, 1884); in general, Burn, *Introduction to the Creeds* (London, 1899); McGiffert, *The Apostles' Creed* (New York, 1902); Allen, *Christian Institutions* (New York, 1897). See further the article CREED, with the literature there cited.

RULE OF THREE. See PROPORTION.

RULES OF THE ROAD. Regulations, prescribed either by custom or by statute, to be observed by travelers either on land or water.

RULES FOR TRAVEL ON LAND. The fundamental rule for travelers on land highways is that each must so use his right of passage as not to interfere unduly with another in the exercise of that other's coördinate right of passage. Accordingly he is bound to use reasonable skill and care, not only in directing his movements as a pedestrian, but in his selection and management of animals or vehicles. In case of travelers whose courses cross, the one first reaching the crossing is entitled to pass on without stopping, while the other should moderate his speed or halt, as occasion may require. This rule applies to pedestrians crossing a city thoroughfare in front of teams. Driving at an immoderate rate of speed, where other vehicles or persons are on the highway, or leaving horses unhitched and unattended, is evidence of negligence, which may render the person who is responsible therefor liable to damages. In England the rule prevails that vehicles going in opposite direction shall pass to the left when meeting; but in this country they must pass to the right. Statutes enforce this rule in many of our States. If vehicles are traveling in the same direction, it is the duty of the foremost traveler to permit any one behind him, who wishes to go more rapidly than he is driving, to pass. In England the rule seems to be that the passing vehicle should bear to the right, while the other bears to the left. In this country the practice in cities is for the passing vehicle to bear to the left; and this has been enjoined by statute in a few States.

RULES FOR TRAVELING ON WATER. The rules of the road for water craft are for the most part quite modern. Those relating to sea-going vessels were formulated, in their present shape, as the result of a maritime conference held in Washington during 1889. They were not entirely new, although they contained some important modifications of existing regulations. In England they are set forth in an Order in Council of November 27, 1896, pursuant to an act of Parliament (57 and 58 Vict., ch. 60). In this country they are embodied in several acts of Congress and a Presidential proclamation (see 28 Statutes at Large 82, 672; 29 ibid. 381, 885). The object of these rules is not only to prevent collisions, but to minimize the effects of those which happen. English courts treat them as a part of the municipal law of each country adopting them. Our courts, however, have declared that, as they have been adopted by all maritime nations, they form a part of the international or general maritime law of the world. In the United States a separate set of rules has been enacted by Congress for the guidance of vessels along our coasts, in our harbors, and on waters connected therewith. (See 30 Statutes at Large 96; 31 ibid. 30.) Still another regulates navigation on the Great Lakes and their adjacent streams. (See 28 Statutes at Large 645.) A fourth applies to vessels navigating the Mississippi River and its tributaries as well as the Red River of the North.

RULES OF THE ROAD AT SEA. The rules of the road are of four classes, concerning (a) lights, (b) fog signals, (c) steering and sailing, and (d) distress and other signals.

LIGHTS. Steam vessels are required to carry the following lights: a white light on the middle line, at a height of 20 to 40 feet, visible at a distance of 5 miles, and which may be seen from directly ahead to 22½° abaft the beam on each side; a green light on the starboard (right) side and a red light on the port (left) side which are visible at a distance of two miles and may be seen from right ahead to 22½° abaft the

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beam, each on its own side; these lights must be fitted with screens on the inboard side so that the green light cannot be seen over the port side, nor the red light over the starboard side. Sailing vessels and vessels being towed are required to carry the red and green side light, but must not carry the white (or masthead) light. A vessel which is not under control because of injury to her steering or motive power must carry two red lights, one over the other, in place of the white (masthead) light. If moving through the water, such a vessel must carry her red and green lights, but not otherwise. In the daytime a vessel which is not under control must carry, in place of the red lights, two balls or shapes at least two feet in diameter. A steam vessel towing other vessels carries the red and green lights and two white lights, one over the other, in place of a single white light. In the inland waters of the United States steam vessels (except sea-going vessels) are required to carry two white range lights, the forward one being the white masthead light, while the after one, showing all around the horizon, must be at least fifteen feet above the other. Sea-going vessels may carry the range lights under the international and United States rules. Small steam vessels (under forty tons, gross measurement) may carry the white light at a height of nine feet; it must be visible at a distance of two miles and the side lights must be visible at a distance of one mile. Steam launches, such as are carried by sea-going vessels, may carry the white light at a less height than nine feet, but it must be carried above the side lights, or such a boat may have a combination red and green lantern which will show the proper colored light on each side and be visible on that side only. Vessels under oars or sails, if of less than twenty tons, must have ready at hand a lantern with red and green sides which may be shown on the proper side to prevent collision. Small boats, whether under oars or sails, must be provided with a white lantern which they must exhibit when necessary. A sailing pilot vessel carries the ordinary lights; also a white light at the masthead which is visible all around the horizon, and must exhibit a flare-up light at intervals of fifteen minutes or less. A steam pilot vessel, in addition to the lights prescribed for steamers, must carry a red light, visible all around the horizon, and placed at a distance of eight feet below the white masthead light. A vessel which is being overtaken by another must exhibit from her stern, where it can best be seen, a white light or flare-up light. A vessel at anchor must carry a white light forward, which must be visible all around the horizon and must not be over twenty feet above the hull; if over one hundred and fifty feet in length she must also carry, at or near the stern and at a height of not more than fifteen feet below the forward light, a white light which is visible all around the horizon. Recognition signal lights may also be carried if duly authorized by proper authority; also flare-up lights to attract attention. All double-ended ferry boats are required to carry white lights, visible all around the horizon, on poles or masts forward and aft. These lights are to be at the same height. Midway between them, at an altitude fifteen feet higher, a white or colored light must be carried. This light must likewise be visible all around the horizon.

Fog Signals. In fog, mist, or falling snow, steamers under way must, at intervals of not more than two minutes, sound a blast of four to six seconds duration on their steam whistles. It the steamer should stop she must sound two such blasts with an interval of about one second. In the inland waters of the United States, steam vessels which are under way must sound their whistle once a minute instead of once in two minutes. A sailing vessel when under way must once every minute sound on her fog horn one blast when on the starboard tack, two blasts when on the port tack, and three blasts when the wind is abaft the beam. A vessel which is towing, laying, or picking up telegraph cable, or under way, but unable to keep out of the way of an approaching vessel through not being under command, or is unable to manœuvre as required by the rules, must, at intervals of not more than two minutes, sound one long blast followed by two short ones. A vessel being towed may sound this signal and must not sound any other. Vessels at anchor must, at intervals of not more than one minute, ring the bell rapidly for about five seconds. Sailing vessels and boats of less than twenty tons gross measurement are not obliged to give the signals prescribed for larger craft, but must make an efficient sound signal once every minute.

Steering and Sailing Rules. These are applicable to all conditions. Vessels must, in a fog, mist, or falling snow, go at a moderate speed, having careful regard to the existing circumstances and conditions. It is customary to construe this rule very liberally; fast steamers slow down very little during such weather, but if a vessel hears the whistle of another vessel ahead she should slow down at once until she has been passed.

When two steam vessels are approaching end on or nearly end on so as to involve risk of collision, each must alter her course to starboard (i. e. incline to the right) so that each may pass on the port side of the other. In United States waters vessels approaching nearly end on must alter their courses to starboard and either must give, as a signal of her intention, one short and distinct blast of her whistle which the other must answer with a similar blast. If the courses of such vessels are so far on the starboard side of each other that they would not be considered as meeting end on, either will give as a signal of her intention two short and distinct blasts of her whistle, which the other must answer with two similar blasts; the vessels will then pass on the starboard side of each other.

Where two steam vessels are steering courses which cross each other the vessel which has the other on her own starboard beam must keep out of the way of the other. In United States waters if there is risk of collision the vessel which has the other on her own starboard bow must, if she intends to turn to starboard and pass under the stern of the other, indicate her intention by one blast of her whistle, while if she intends to turn to port she must sound two blasts. These signals must be promptly answered by the other vessel.

In the international rules, when vessels are in sight of one another, a steam vessel which is taking any course authorized by the rules must indicate that course by the following signals on her whistle or siren, namely: One short blast to

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indicate "I am directing my course to starboard;" two short blasts to indicate "I am directing my course to port;" and three short blasts to indicate "My engines are going full speed astern."

When a steam vessel is overtaking another she must keep out of the way of the other. When the vessels are crossing at an angle such that the overtaking vessel could not see the other's side lights, if at night, the vessel coming up with the other shall be deemed an overtaking vessel.

In narrow channels every steam vessel must, when it is safe and practicable, keep to that side of the fairway or mid-channel which lies on the starboard side of such vessel.

When a steam vessel and a sailing vessel are proceeding on such courses as to involve risk of collision, the steam vessel must keep out of the way of the other. When by any of the rules one of two vessels is required to keep out of the way of the other, the latter must keep her course and speed, but in interpreting the rules regard must be had to all dangers of navigation and to any special circumstances which may render a departure from them necessary to avoid immediate danger, and nothing in any of the rules will exonerate any vessel or her master, owner, proprietor, or crew from the consequences of any neglect to carry lights or signals, or keep a proper lookout, or to take any precaution which may be required by the common practice of seamen or by the special circumstances of the case, and nothing in the rules shall interfere with the operation of a special rule, duly made by local authority, relative to the navigation of any harbor, river, or inland water.

When two sailing vessels are approaching one another so as to involve risk of collision, one of them shall keep out of the way of the other as follows, viz.:

(a) A vessel which is running free shall keep out of the way of one which is close-hauled.

(b) A vessel which is close-hauled on the port tack shall keep out of the way of one which is close-hauled on the starboard tack.

(c) When both vessels are running free, with the wind on different sides, the vessel which has the wind on the port side shall keep out of the way of the other.

(d) When both are running free with the wind on the same side, the vessel which is to windward shall keep out of the way of the one which is to leeward.

(e) A vessel which has the wind aft shall keep out of the way of one which has the wind on some other bearing.

DISTRESS SIGNALS. When a vessel is in distress and requires assistance from other vessels or from the shore, the following shall be the signals to be used or displayed by her, either together or separately, viz.:

In the daytime—(1) A gun or other explosive signal fired at intervals of about a minute. (2) The international code signal of distress indicated by NC. (See Plate with article SIGNALS, MARINE.) (3) The distance signal, consisting of a square flag having either above or below it a ball or anything resembling a ball. (4) A continuous sounding with any fog signal apparatus.

At night—(1) A gun or other explosive signal fired at intervals of about a minute. (2) Flames on the vessel as from a burning tar barrel, oil barrel, etc. (3) Rockets or shells throwing stars of any color or description, fired one at a time, at short intervals. (4) A continuous sounding with any fog-signal apparatus.

Copies of the complete rules may be obtained free of charge at naval branch Hydrographic Offices and at small expense from most dealers in nautical instruments.

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RULING MACHINE. A mechanical device by means of which parallel lines may be ruled on a surface at regular or definitely spaced intervals. The ruling machine employed by engravers is a form of dividing engine (q.v.) and is used in making tinted surfaces on blocks for printing. It consists of a tool that can be given a lateral motion by a screw or other device and a transverse or cutting motion as it is moved across the surface. The term ruling machine is also applied to a device used for ruling the lines in account and other blank books. This machine consists of a series of fountain pens or thread supplied with ink of the desired color, which press against the paper. See DIVIDING ENGINE.

RUM (abbreviation of *rumbullion* or *rumbooze*, the first word being perhaps an extended form of *rumble*, and the latter from *rum*, good, Gypsy *rom*, husband, *Rommani*, Gypsy, from Hind. *ḍōm*, *ḍomrā*, from Skt. *ḍōmba*, name of a low caste + *booze*, *bouse*, from MDutch *būsen*, Ger. *bausen*, to guzzle). A spirit made by fermenting and distilling molasses and the refuse which accumulates in making cane sugar. The best rum is made from the pure molasses; a second grade is obtained from the skimmings and other wastes of sugar-making. Fermentation is induced by the use of dunder; molasses is added, in the proportion of 6 to 100, and the fermentation allowed to continue to completion. When new, rum is white and transparent; its color is produced after distillation by adding caramel-color. Rum is greatly improved by age and when very old has a high commercial value. The manufacture was at one time an important industry in New England, but has constantly decreased. The best rum is made in Jamaica. It owes its peculiar flavor to butyric ether, which fact is taken advantage of to produce an artificial rum. Consult Sadtler, *Organic Chemistry* (Philadelphia, 1900). See DISTILLED LIQUORS OR ARDENT SPIRITS and LIQUORS, FERMENTED AND DISTILLED, STATISTICS OF.

RUMA'NIA. A kingdom of Europe, the most northeastern country of the Balkan States. It embraces the former principalities of Moldavia and Wallachia (united in 1861) and the district called the Dobrudja, detached from Bulgaria in 1878. The Eastern Carpathians and their westward continuation, the Transylvanian Alps, presenting their convex side to Rumania, are the western and northern barriers separating the kingdom from Hungary. The Danube marks the line between Rumania and Bulgaria on the south, except in the extreme east of the country, where there is an artificial boundary. The Black Sea bounds the country on the east for a distance of about 130 miles. In the extreme north an artificial frontier extends between Rumania and Russia, and the Pruth separates them on the

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east. In the extreme west the kingdom touches Servia, the Danube forming the boundary. Rumania extends from latitude 43° 40′ to 48° 15′ N. Area, 50,540 square miles, Rumania being the largest Balkan State except Turkey.

TOPOGRAPHY. The surface features comprise the mountain barrier in the west; the mountain forelands and foothills extending into the country for 30 to 40 miles from the Carpathian ranges; the two low plains spreading away everywhere to the east and south of the mountain region; and the higher lands of the Dobrudja, the region between the Danube and the Black Sea. The Dobrudja has low coasts, but its interior is a steppe-like plateau. The great walls of the Carpathians and the Transylvanian Alps, the latter rising over 8000 feet in several places, slope down to the Rumanian plains in finely wooded declivities, divided by the valleys of many rivers. The Moldavian plain, occupying the eastern part of the country, descends to the south and is deeply trenched by many tributaries of the Danube, the principal being the Sereth. The Wallachain plain occupies the entire south, has a general southeasterly incline, and is traversed by the Aluta, Arjesh, Yalomitsa, and other affluents of the Danube. The Moldo-Wallachian plain is physically a part of the great plain of South Russia. The Danube is the great highway of the kingdom. Before it reaches the delta it divides into many branches, and courses over a flat, marshy, alluvial plain, rather difficult of access.

CLIMATE, FLORA, AND FAUNA. Though in the same latitude as Northern Italy, the land has far greater climatic extremes. Its bitterly cold winters are due to its being exposed to the winds from the Russian steppes; the winds from the Mediterranean subject it to subtropical summer heat. The mercury sometimes rises to above 100° F. in the shade, and at times sinks below —20°. The Danube is usually ice-bound about three months. The annual rainfall ranges from 15 to 20 inches and is unequally distributed. The soils, particularly the black earth of the plains, make Rumania one of the most fertile countries of Europe.

Three zones of vegetation are distinguished: the high Alpine zone in the mountains, the forest zone of the lower mountain slopes and foothills, and the steppe zone of the prairie regions. The mountains are clothed with pines, larches, firs, dwarf junipers, and birches. Firs are the prevailing trees among the foothills. Varieties of oak grow on the plains, beeches, chestnuts, and maples being also planted. The black alder grows on the marshes. The mountains present great stretches of woodlands, but large forest tracts are now rarely met on the plains and a great part of the Dobrudja is treeless. The fauna resembles that of Russia (q.v.).

GEOLOGY AND MINERAL RESOURCES. The Carpathians and the Transylvanian Alps consist mainly of crystalline schists with extensive intrusions of Jurassic and chalk beds. Earthquakes, originating among the mountains, seem to show that the process of mountain formation is still in progress. The two great low plains are covered with the black loess of South Russia, with large admixtures of pebbles and clay in the southern plain of Wallachia. This region is traversed by Eocene formations, and by strongly folded Miocene strata, which often contain salt and petroleum. The plain of Moldavia, on the other hand, consists of late Tertiary formations. The mineral wealth is very great. Gold, silver, iron, lead, quicksilver, copper, manganese, coal, building materials, petroleum, and salt are all found, but only the last three are worked to any great extent. Gold, in particles and scales, is found in some of the rivers. Recent discoveries show quicksilver in large quantities in Wallachia. Marble of excellent quality, and clays and sands suitable for porcelain and glass wares, are abundant. The salt deposits cover an enormous area in Moldavia and Wallachia, and as many of the beds have a thickness of 750 feet or more, Rumania could supply Europe for centuries. The salt industry has been a State monopoly since 1862. The output in 1900 was 104,665 tons, nearly all being exported. The oil-bearing region is very extensive and is beginning to be exploited by foreign capitalists. The product of petroleum in 1900 was 221,387 tons. All the metals are little mined, for lack of Rumanian capital and transportation facilities.

AGRICULTURE. Seventy per cent. of the people are engaged in agriculture. Rumania is one of the three large granaries of Europe. But agriculture is still very backward; the peasantry, serfs until recently, have made progress slowly, and methods and implements are still primitive, though modern farm machinery is being largely introduced on the estates. Nearly half of the whole surface is under cultivation. Tillage and stock-breeding outweigh all other resources to a greater extent than in most European States. The land is particularly well adapted for cereals. Wheat and maize are the chief crops. The area under wheat in 1900 was nearly 6000 square miles. The area under maize is a fourth greater. The acreage of barley, oats, and rye together is about half of that of maize. Maize, the chief crop, yielded 116,937,205 bushels in 1901. It is the staple food of the peasantry, and with wheat and barley comprises the bulk of the exports. Tobacco is a State monopoly cultivated wholly under Crown management. In 1901, 10,666 acres were under the crop. Both soil and climate are adapted for the vine, which grows chiefly among the foothills of the mountains overlooking the plains. The vineyards embraced, in 1901, 330,048 acres. Cotnar and Odobesci—dessert wines—vie with the famous vintages of Hungary. Prunes are important in the foreign trade. The kingdom had, in 1900, 864,746 horses, 2,589,000 cattle, 5,644,210 sheep, and 1,709,909 swine. Stock-raising is carried on with little skill or method. There are few stables, and most of the animals are exposed without shelter to the rigorous winter. The exports of hog products to Austria-Hungary and Russia is important. Sheep-breeding is carried on everywhere for mutton, cheese (which is in great demand), and wool, but is declining, especially in the hill districts. The rearing of silkworms, once an important house industry, is reviving under Government patronage. Rumanian streams are well supplied with fish.

MANUFACTURES AND COMMERCE. The house industries supply the peasants with most of their personal needs. Foreign capital is being attracted and industrial development is making considerable progress. Several hundreds of flouring mills turn much of the wheat into flour, which is exported even to England; in 1901 the sugar factories had an output of 25,350 tons,

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and there are many other manufactures of different kinds. Expensive freight rates and high customs are the chief hindrances to trade in Rumania. The total volume of the foreign commerce for 1901 was $129,300,000. Textiles stand far in the lead among the imports, and breadstuffs are by far the most important item in the exports. Other noteworthy items of the imports are metals and their manufactures, chemicals, drugs, and groceries; and fruits, vegetables, groceries, chemicals, wood and wooden wares, animals, and animal products figure to some extent among the exports. In the Rumanian commerce Belgium, Germany, and Austria-Hungary figure most extensively.

TRANSPORTATION AND COMMUNICATION. The only important ports directly on the Black Sea are Sulina and Kustendje. The latter is a new port, but promises to become important. Far more important at present are the large commercial cities of Galatz and Braïla, at the head of deep-water navigation on the Danube. Braïla is the great wheat-exporting port of the country. In 1901 the vessels entering the ports were 29,296, with 8,187,927 tons. In 1902 the commercial marine of Rumania consisted of 391 vessels, of 75,440 tons, including 72 steamers, of 16,146 tons. A large number of steamboats and sailing vessels ply on the Danube, and much timber and grain is transported to the Danube by steamer, barge, or raft on the Sereth and the Pruth. The State owns all the railroads, of which about 2000 miles were in operation in 1903.

GOVERNMENT AND FINANCE. Rumania is an hereditary constitutional monarchy. The present Constitution, enacted by a Constituent Assembly elected by the people in 1866, was amended in 1879 and again in 1884. According to its provisions the executive department is vested in the King, who has power of suspensive veto, and a Cabinet of eight members, including a Prime Minister. The legislative department is composed of a Senate and Chamber of Deputies, the members of both of which are chosen (in part indirectly) by electoral colleges, made up of all taxable citizens classified according to the amount of taxes paid, property owned, or educational qualifications. The Senate has 120 members, elected for a term of 8 years. The heir apparent, 8 bishops, and 2 representatives selected by the universities of Bucharest and Jassy are members of the Upper House. The Chamber of Deputies has 183 members, chosen for four years. Senators to be eligible must be 40 years of age and have an annual income of about $1800. Deputies must be 25 years of age. The Code of Napoleon is the basis of the legal system. For its local government, Rumania is divided into 32 districts. The capital of Rumania is Bucharest.

The revenues are derived from the indirect taxes (stamp, legacies, spirits, and beer taxes); direct taxes (real estate, building taxes, road tolls, licenses for the sale of spirits, and registration fees, trades); monopolies (tobacco, salt, matches, playing cards, and cigarette paper); sale of and revenue from public lands; and customs. In 1903-04 the revenue was approximately $44,000,000, and the expenditure $42,600,000. The public debt amounted on March 31, 1902, to $275,601,179.88. More than half had been contracted for public works, mainly railways. The foremost financial institution is the Rumanian National Bank, at Bucharest, with branches in the important towns. On December 23, 1900, it had a note circulation of $23,737,350.

MONEY, WEIGHTS, AND MEASURES. The gold standard was introduced in 1888. As gold coins are minted only in limited quantities, the short supply is widely supplemented by foreign pieces. The gold len (equaling one franc) is the unit of coinage, and the small change is of silver or bronze. The metric system of weights and measures is legalized, but Turkish denominations are used to some extent. For army, see ARMIES.

POPULATION. The population of Rumania, by the census of 1899, was 5,912,520, of whom the Rumanians numbered 92.5 per cent. Bucharest had a population in 1899 of 282,071. The next largest town, Jassy, had 78,069 inhabitants.

RELIGION AND EDUCATION. Orthodox Greek is the State religion, but all confessions enjoy full freedom. The State Church is independent of all 'alien prelates,' and the Metropolitan Primate is appointed by the legislative bodies and confirmed by the King. In 1899 there were 5,408,743 members of the Greek Church, 168,276 Catholics and Protestants, 269,015 Jews, and 43,740 Mohammedans. The percentage of illiterates is very high, the census of 1899 showing that 88.4 per cent. of the population could not read or write. Though education is 'free and compulsory,' no schools have as yet been established in many of the village communes. There are two universities—one at Bucharest, with about 80 professors and over 4000 students, and one at Jassy, with about 50 professors and 800 students.

ETHNOLOGY. The Rumanians, or Wallachs, constitute a race whose origin has been much discussed and is still by no means clear. Only about half of the Rumanians inhabit the modern Kingdom of Rumania. The remainder are found in the neighboring regions of Eastern Hungary (mainly Transylvania), Bukowina, Bessarabia, Servia, and Bulgaria, besides scattered groups in other parts of the Balkan Peninsula. These smaller groups are rapidly disappearing among the surrounding peoples. The most important of the detached Rumanian communities is that inhabiting the Mount Pindus districts. These are called Tsintsars or Kutzo-Vlachs by their Macedonian neighbors, but their true name is Aramâni or Armâni, i.e. 'Romans.' The popular belief and claim of the Rumanians is that they are the direct descendants of the Roman colonists sent into the conquered province of Dacia (the modern Rumania) by the Emperor Trajan. This theory has been severely attacked by Rösler, Hunfalvy, and others, and seems questionable both on historical and linguistic grounds. The Emperor Aurelian (270-275) withdrew the Roman colonists from Dacia to the south side of the Danube, and from that time until the thirteenth century Dacia was given over to the barbarian hordes, who swept over the country repeatedly. During this time the Roman language and culture seem to have disappeared, and the former was first reëstablished in its modern form in connection with a northern movement of the Rumanians from the regions south of the Danube. This would seem to support the view that the final area of dispersion was to the south, and possibly in the neighborhood of the Pindus region. Here would also be the seat of the development of the language. Numerous linguistic characteristics seem to support this view.

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On the other hand, it is not at all necessary to suppose that all or even a majority of the inhabitants of reorganized Rumania came from the south. The number was probably relatively few. The study of the head form of the modern Rumanians shows dolichocephaly in the east, the breadth of the head increasing to brachycephaly in the west. This eastern dolichocephaly along the Black Sea is regarded by many as a survival from a primitive long-headed race, which formerly occupied almost all Eastern Europe before the Slavic invasions. If this be true, it shows a continuance of race in spite of invasions. It is also noteworthy that in physical type the Rumanians differ but slightly from the Bulgarians, which would seem to show that the mass of the people have been but slightly affected by their conquerors. The Rumanians may then be regarded as a mixture, varying in different regions, of this primitive population with Roman colonists, and Teutonic, Slavic, and Mongol invaders. Consult: Rosny, *Les Romains de l'Orient, aperçu de l'ethnographie de la Roumanie* (Paris, 1885); Hunfalvy, *Ethnographie von Ungarn* (Budapest, 1877).

HISTORY. The modern Kingdom of Rumania, which dates in its present political organization only from 1881, was formed by the union of the two kindred principalities of Moldavia and Wallachia (qq.v.). These countries form the greater part of the large area conquered by the Emperor Trajan (A.D. 101-106) and made the Roman Province of Dacia (q.v.). The Dacians, according to the Roman accounts, were a warlike race, and under their King, Decebalus, made a vigorous resistance to the conquest. During the reign of Alexander Severus, in the second quarter of the third century, the province began to suffer from the inroads of the Goths, and in the reign of Aurelian (270-275) it was finally abandoned to these Germanic invaders, with whom the Emperor established an honorable alliance. A majority of the inhabitants crossed to the south of the Danube, but many remained among the Goths and introduced the arts of Roman civilization. The Goths were later crowded out by the Huns and the country was overrun by successive barbarian invasions. The present inhabitants are of a much mixed race, their language being a Romance tongue.

In the eleventh century the Cumans, a Turkish people, established themselves for a time in Moldavia, and two centuries later the country fell into the hands of the Nogai Tatars and the people were driven into the forests and mountains. The history of the period of recovery of Wallachia and Moldavia from the barbarians and of their organization into States is very imperfectly known and is not of particular importance.

In the latter part of the thirteenth century we find a Wallach, or Ruman, principality in the region between the Lower Danube and the Transylvanian Alps, which took its place in the map of Europe as Wallachia. A little later by the side of this arose another Wallach principality, which took the name of Moldavia, from the River Moldava, an affluent of the Sereth. Both principalities had to face the tide of Turkish invasion which after the middle of the fourteenth century swept over Southeastern Europe. At the same time they had to contend against the kings of Hungary. By the beginning of the fifteenth century Wallachia had become a vassal State of the Ottoman Empire, being forced to pay regular tribute; Moldavia held out a century longer. It was long, however, before the Turks succeeded in actually subjecting the principalities to their sway, and more than once they suffered defeat at the hands of the Ruman voivodes or princes. The rule of the voivodes of Wallachia and Moldavia presents a dismal and bloody record, vigor and ability on the part of the princes going hand in hand with savagery. For a moment, at the close of the sixteenth century, the Wallach, or Ruman, nationality was brought under the sway of a single monarch, Michael the Brave of Wallachia, who brought Moldavia and Transylvania (inhabited in great part by Wallachs) under his sceptre. Michael was assassinated in 1601 and this Great Rumania vanished, to be revived in the dreams of the Rumanian patriots of to-day, whose aspirations are directed to the establishment of a Dacian realm of which Transylvania shall form a part.

In the seventeenth century the hold of Turkey (then in its decline) upon the principalities was gradually tightened, and at last their independence was practically extinguished. The Rumanian soil, however, was not opened to the Turks for settlement. The onslaughts of Russia upon the Ottoman Empire introduced a new and sinister element into the life of the principalities. In 1710 the voivodes sought to free their States from the Turkish yoke with the assistance of Peter the Great. (See KANTEMIR.) The Czar was hemmed in by the Turks on the River Pruth (1711) and escaped only by agreeing to a humiliating peace. After this the Porte ruled Moldavia and Wallachia through hospodars or governors taken from among the Greek Fanariot families (see FANARIOTS), who, in their greed and lack of sympathy for the inhabitants, exploited the principalities in a merciless manner. Many of the families of the boyars or nobles became allied with the Fanariot houses and Greek became the official language. This tended very much to obscure the national feeling. Again and again the armies of Russia, in her wars with Turkey, traversed and occupied the unhappy provinces. Bukowina, in 1777, and Bessarabia, in 1812, were severed from Moldavia and annexed to Austria and Russia respectively. The ambitious designs of Russia looked to the incorporation of Moldavia and Wallachia in the empire of the Czar. And the fact that their inhabitants belonged to the Greek Church afforded a pretext for interfering in the affairs of the principalities. The outbreak of the Greek struggle for independence, the first episode of which was enacted at Jassy in 1821 (see YPSILANTI, ALEXANDER), put an end to the Fanariot rule in the two Danubian Principalities and boyars were allowed to choose the hospodars from natives.

The Rumanian language took its place again, and, under the stimulus of the teaching of the history of the people, promoted especially by four Rumanian historians, Şincai, Maior, Asachi, and Lazar, a spirit of nationality was developed which looked to independence and gave a new unity to the ideas and purposes of the two States.

In the Treaty of Adrianople of 1829 Turkey was forced to accord to Russia a protectorate over the Danubian Principalities. The hospodars, among whom were some strenuous and enlightened rulers of the family of Ghika (q.v.), were reduced almost to the position of lieutenants of the Czar. But the schemes of Russia aroused

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patriotic opposition, and the unsuccessful issue of the war waged against Turkey and her Western allies (1853-56) deprived Russia of her hold on the Danubian Principalities.

The Congress of Paris in 1856 recognized the need of a modification of the relations of the Porte to the principalities, but would not concede complete independence. They were organized as the United Principalities of Moldavia and Wallachia, each having its own hospodar and government, but with a common commission of sixteen members and a general court of justice. In 1859 both elected the same hospodar, a boyar of Moldavia, Prince Cuza, and in 1861 he was proclaimed Prince of Rumania under the name of Alexander John I. (q.v.). The Sultan recognized the new adjustment, and the long desired union was accomplished. Prince Alexander was deposed in 1866 because of his arbitrary government, and Prince Charles of Hohenzollern was elected as hereditary Prince under a modern constitution, it being found impossible to reach an agreement on any member of the native nobility. An efficient army was organized by Prince Charles on the Prussian model, and when war broke out between Russia and Turkey in April, 1877, Rumania entered into alliance with Russia, giving the armies of the latter free passage through Rumanian territory. On May 21st the Rumanian Parliament declared the country independent. The Rumanian army joined the Russians in the field, and in the operations at Plevna the forces of the principality bore an important and wholly creditable part. (See RUSSO-TURKISH WAR.) The Berlin Congress in 1878 recognized the independence of Rumania, but in spite of the protest of the Rumanian envoys restored to Russia the strip of Bessarabia, touching the Pruth and the Danube, which had been annexed to Moldavia in 1856. Rumania, however, received the Dobrudja. It was further stipulated that difference of religious profession should not disqualify from the exercise of full civil and political rights in Rumania. The last stipulation introduced the Semitic question into the politics of the new State by bringing a quarter of a million Jews into its citizenship, a condition which has never been acquiesced in by the Christians, who have continued to persecute the downtrodden race, many of whom have emigrated to the United States. In 1881 the Government declared Rumania a kingdom, and this was accepted by the Powers. In 1893 King Charles summoned his nephew and heir, Prince Ferdinand, to the kingdom and the latter's son was baptized into the Greek Church.

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RUMANIAN LANGUAGE AND LITERATURE. RUMANIAN LANGUAGE. A Romance tongue spoken in three dialects, the Daco-Rumanian, in Rumania, Transylvania, Bessarabia, the Hungarian Banat, and Bukowina—that is, in old Dacia, by about 9,000,000 people; the Macedo-Rumanian, in Macedonia, Albania, Thessaly, and Epirus, by several hundred thousand people; and the Istro-Rumanian, in Istria, by about 3000 people. The Daco-Rumanian dialect comprises the Wallachian, Moldavian, Transylvanian, and Banatian sub-dialects. The Rumanian developed from the vulgar Latin spoken in Dacia and Mœsia under the influence successively of the Turano-Bulgarian, Albanian, Slavic, Hungarian, Turkish, and Modern Greek. These influences affected little the grammatical structure of the language, but greatly changed its vocabulary. About 3800 words are Slavic, about 2600 come from the vulgar Latin, about 700 are Turkish, 650 Greek, 500 Hungarian, and 50 Albanian.

The spelling of the language is pretty nearly phonetic. Rumanian has two guttural vowel-sounds, the one written *ă*, *ĕ*, and the other *î*, *â*, *ê*. As in Italian, *c* and *g*, when followed by *e* or *i*, have a soft (palatal) sound. There is a post-positive article: *om*, 'man;' *omul*, 'the man;' *oamenĭ*, 'men;' *oa-menii*, 'the men;' *frate*, 'brother;' *fratele*, 'the brother;' *fraţĭ*, 'brothers;' *fraţii*, 'the brothers;' *floare*, 'flower;' *floarea*, the flower;' *florĭ*, 'flowers;' *florile*, 'the flowers.' The cardinal numbers from 11 to 19 are formed by means of the word *spre-on*: *un-spre-zece*, etc.; those from 20 to 90 by means of the plural of *zece* 'ten:' *douĕ-zecĭ* (20), *treĭ-zecĭ* (30), etc. The declensions and conjugations are very much like those of Italian. There are three declensions and a neuter gender. Very frequently in nouns the plural differs materially from the singular: *Om* 'man;' *oamenĭ*, 'men;' *cap*, 'head;' *capete*, 'heads;' *sorĕ*, 'sister;' *surorĭ*, 'sisters.' There are four conjugations. Verbs have two forms in the infinitive, a short and a long one: *lăuda*, *laudare*, 'to praise;' *tăce*, *tăcere*, 'to be silent;' *duce*, *ducere*, 'to lead;' *dormi*, *dormire*, 'to sleep.' The future and conditional present are formed with auxiliaries; *voiŭ fugi*, *aş fugi*, 'I shall run,' 'I should run.' The passive is rendered by the third person singular: *Mă bate*, *te bate*, *îl bate*, 'I am, thou art, he is beaten.' The language is rich in suffixes, especially for the formation of diminutives: *Ioan* (John), *Ionică*, *Ioniţă*, *Ionaşcu*, *Ianache*, *Ienăchel*, etc.

RUMANIAN LITERATURE. Unlike other Romance literatures, Rumanian did not grow up under the influence of Occidental civilization, but down to the nineteenth century at least it was influenced by the Orient. It divides itself into three periods:

THE SLAVIC PERIOD (from the middle of the sixteenth century to 1710). The literature of this period is mediæval and religious in character. The old religious literature was written in Slavic. The desire to reach the common people led to

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translations of the Scriptures into Rumanian. The oldest extant documents are the Gospel (Kronstadt, 1560-66), the History of the Apostles (1568-70?), and the Psalms (1577), literal translations by Dean Coresi. Of special importance is the translation of the Psalms by Archbishop Dositheu, the author of the remarkable *Vitæ Sanctorum*, and one of the most prominent literary figures in the second half of the seventeenth century. The first complete translation of the Bible was carried out by Radu Greceanu upon the command of Prince Joan Şerban Kantacazino Basarab (Bucharest, 1688); it is written in the Wallachian dialect, and is the most important literary monument of the entire literature. In 1643 the Rumanian was admitted into State and Church upon an equal footing with the Slavic, but the Slavic language and alphabet persisted, and the important books of devotion continued for a long time in Slavic, the substitution of Rumanian lasting fully two centuries.

Besides the Church literature, the only other branch of literature cultivated was history. Of great importance for the early history is the anonymous *Lêtopisețul țăriĭ Romînești și a țăriĭ Moldoveĭ* (the chronicle of the Rumanian and Moldavian countries). The Prince D. Cautemier, a famous polyglot (1673-1723), besides a history of the Ottoman Empire, left *Kronikul Moldo-Vlahilos* (the chronicle of the Moldavo-Wallachians), which he wrote in Latin and translated himself into Rumanian. These two chronicles treat of all Rumania. The oldest chronicle of Moldavia is the one of Ureche, from 1359 to 1594. The history of Moldavia before 1359 and after 1594 (down to 1662) was treated in two excellent chronicles by Miron Costin, who also wrote a history of Hungary from 1388 to 1681, and a poem in Polish on the colonization of Dacia and the foundation of the two principalities. His son, Neculai Costin (1660-1712), left a chronicle, in which, beginning with the creation of the world, he brings down Miron Costin's chronicle to 1711. The oldest and most important historical document of Wallachia is a chronicle which covers the period from 1290 to the beginning of the eighteenth century.

THE GREEK PERIOD. From 1710 to 1830 the principalities were governed by Greeks from Constantinople, who bought their thrones from the Porte. The Greek language became a successful rival of Slavic, ultimately prevailing in the State, court, schools, and among the upper classes. Works were now translated or imitated from the Greek. The intellectual labor begun during the Slavic period, far from being checked or even destroyed by the Greek influence, as some critics, biased by patriotic zeal, opine, was continued during this period.

Church literature continued to develop. In Transylvania, owing to the close proximity to the Catholic world, Catholicism exerted a strong influence, and Western ideas and forms gained ascendency. Instead of Greek and Slavic models, Latin models were followed. Samuel Klain (1745-1808), who revised the Bible, and Peter Maior (1753-1821), two of the most active men of the period, published sermons and funeral orations patterned after Latin models. In Wallachia the rhymed chronicle was flourishing. The history of Moldavia, however, is represented by one remarkable work, the chronicle written by Neculcea, from 1662 to 1743; it continues that of Ureche, and is excellent both in point of form and contents. In Transylvania, owing to the oppression at the hands of the Hungarians, and to the endeavors of the Catholic Propaganda to link the Rumanians to Rome, the historians, stirred by racial and patriotic zeal, desired to arouse the national consciousness of the people, and wrote with a view to demonstrating the kinship of the nation with the Latins. In this spirit were written, at the beginning of the nineteenth century: Klain's *Istoria Romînilor din Dakiea* (the History of the Rumanians of Dacia), Maior's *Istoria pentru inceputui Romînilor* (A History of the Origin of the Rumanians) (1812), and Gheorghe Sincai's (1754-1826) *Cronica Romînilor*, printed in 1853, a monumental work based upon most thorough researches of all the sources then accessible in the libraries of Europe.

Toward 1800 Western influence set in, and gradually led to a total transformation of Rumanian literature, which at last cast off its mediæval and religious features, and adopted Western ideas and Western forms of art. Western, especially French, ideas ousted the Slavic and Greek influences from their old strongholds.

Among the notable poetic productions of the end of the Greek period are the *Țiganiada* (the Epic of the Gypsies), by Joan Delaeanu, a mock-heroic poem replete with wit and irony, and the lyrics of Joan Văcărescu (1800-63), of Constantin Conachi (1777-1849), and especially those of Vasile Cărlova (1809-1831), a genuine poet. The most prominent poetic figure, however, though partly belonging to the modern period, was Anton Pann (1797-1854), a Bulgarian by birth, who drew his theme and inspiration from the vast popular literature, both laic and religious, that had accumulated during the two periods. His writings, mostly in verse, exerted great influence upon the middle and lower classes, and are even now widely read by the common people.

THE MODERN PERIOD extends from 1830 to our own day. It is marked by a complete though gradual emancipation from foreign influences. The interval between 1830 and 1848 was, however, yet one of preparation. Greek and French influences still continued. The Latinist movement, which originated in Transylvania, and was there so ably championed by Klain, Şincai, and Maior, crossed the Carpathian Mountains with Gheorghe Lazăr (1779-1823), who, together with a host of his disciples, chief of whom were G. Asachi (1788-1871) in Moldavia, and the brilliant Joan Eliade-Rădulescu (1802-72) in Wallachia, aimed at the complete Latinization of the language, the last-named even attempting to Italianize it. Eliade was, nevertheless, the main factor in the literary revolution. He freed the language from the Slavic alphabet; by insisting upon the close kinship of the nation with the other members of the Latin race he saved it from intellectual isolation and strengthened its national consciousness; and more than any one else he contributed toward the diffusion of the literary master works of Western Europe.

But a national literature in the full sense of the word has existed only since about 1848. In Transylvanian we have Andreĭ Mureşianu (1816-63), a patriotic poet, who composed the national song, "Awake, Rumanian, from thy lethargic sleep!" the philologists Timoteiu Ciparin

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(1805-87) and A. T. Laurianu (1810-80), and the historian A. Papiu Ilarianu (1828-77). In Wallachia Nicolai Bălcescu (1819-52), a revolutionary of 1848, wrote the *History of the Rumanians Under Michael the Brave.* Dimitrie Bolintineanu (1827-72) was most successful in his national ballads, the subjects of which he borrowed from the old chronicles. Grigorie Alecsandrescu (1812-85), distinguished himself by his patriotic odes and his satires, and won great popularity through his fables. In Moldavia Constantin Negruzzi (1807-68) translated into verse Pushkin and Victor Hugo, and excelled in prose. Mihail Cogălniceanu (1817-91), the greatest orator of the period, published the Moldavian chronicles.

The great names of the modern literature are those of Alecsandri and Hăsdeu. Vasile Alecsandri (1821-1890), noted as a lyric and dramatic poet especially, succeeded in combining in himself Western culture with national inspiration. He published, in Rumanian and French, popular songs collected by himself from the mouths of the peasants. In 1866, with Negruzzi, he founded the *Convorbirĭ literare* (Literary Talks), the most important literary review. In 1878, at the floral games in Montpellier, his *Cîntecul Gînteĭ Latine* (Song of the Latin Race) carried off the prize set for the best poem on the Latin race. B. P. Hăsdeu (1836—) is a man of encyclopædic erudition. His best literary work is *Răsvan Vodă* (Prince Răsvan) (1867), an historic drama. But his great importance lies in the domain of history and philology. He wrote various works on Rumanian history, and published the vast collection of documents entitled *Historical Archive of Rumania.* Among his philological publications may be mentioned his *Cuvente din bătrânĭ* (1878) (Words from Our Ancestors), and his *Etymologicum Magnum Romaniæ,* a dictionary of vast compass and still in its initial stage.

V. A. Ureche (1834) published a *History of the Rumanians* (8 vols., 1895), and founded, in 1866, the Academy, which issued the monumental Hurmazache collection of historical documents (15 vols., 1880-95). G. Tocilescu (1846—) wrote a history of Dacia before Trajan, and A. D. Xenopol (1843—) published a very good *History of the Rumanians* which has been translated into French. Of the great number of writers of fiction and poetry may be mentioned: N. Ganea (1835—), Slăviciĭ (1848—), Jacob Negruzzi (1842—), the peasant J. Creangă (1837—), an excellent narrator, P. Ispirescu (1830-87), a collector of folk-tales, A. Odobescu (1834—), an historical novelist, and the women A. Veronica Miclea (1850—) and Matilda Poni (1853—). Next to Alecsandri stands Mihail Eminescu (1849-1889), a lyric poet of genuine inspiration, though strongly pessimistic. Among his poetic followers are Alecsandru Vlăhuță (1859—), De la Vrancea (Barbu Ştefanescu) (1858—), Ghorghe din Moldova (Chembach), Artur Stavri (1869—), O. Carp (Gh. Proca), Haralamb G. Lecca. A place apart is occupied by George Coşbuc (born 1866 in a small town in Transylvania); his lyrics are hopeful and strong. The drama is ably represented by J. L. Caragiale (1852—), who depicts with much skill and wit and humor the political and social manners of the middle classes of his time. Caragiale, Vlăhută, and Cosbuc are the most reputed poets of the day.

The last two decades of the nineteenth century were marked by the small group of writers that gathered about the *Contemporanul,* a review founded (1881) by the Socialist Ioan Nadejde 1850—), who has the culture of the Occident, literary and philologic, historic and scientific. His wife, Sofia Nadejde, who was one of the ablest contributors to the *Contemporanul,* Const. Mille, V. G. Mortzun, and Th. Speranza (1856—) are the better known poets of this group. Its literary theoretician is C. Dobrogeanu-Gherea (1854—), a critic of great ability, who fought with great success against the established æsthetic theories represented by Titu Maiorescu (1840—), the leader of the *Junimea* (Youth), a conservative literary society, which held the field between 1860 and 1880. From a literary standpoint the *Revista Nouă* (The New Review) founded (1887) by B. P. Hăşdeu, was a successful rival of the *Contemporanul.* The influence upon the youth exerted by Nădejde and his friends was great. The radical thought of Europe, the most modern ideas, the most recent discoveries, the latest intellectual movements, were all brilliantly popularized in the *Contemporanul.* With the activity of Nădejde and his friends was consummated the intellectual revolution begun toward the end of the eighteenth century—to wit, the utter transformation of the old Rumanian society and literature, essentially Oriental, through the diffusion of the best thought of Western Europe.

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to the folk-tales of the Romance peoples) (ib., 1895). In Şaineanu's *Istoria filologiei romîne* will be found a very good bibliography of folk-lore collections.

RÜMANN, rü'män, WILHELM VON (1850—). A German sculptor, born at Hanover, pupil of the Munich Academy and of Wagmüller. He received a gold medal in 1892. His principal works include the group of the "Goddess of Victory" at Wörth, the Rückert Monument at Schweinfurt, and the statues of William I. at Stuttgart and at Heilbronn.

RUMBURG, rum'bōōrk. A town of Bohemia, Austria, 25 miles northwest of Reichenberg, on the Saxon frontier. It has extensive manufactures of linen, cotton, and woolen goods. Population, in 1900, 10,388.

RUME'LIA, EASTERN (Turk. *Rumili*, a name originally designating the land of the Greeks). A region under the rule of the Prince of Bulgaria and virtually forming part of the principality. It is bounded by the Balkans on the north and the Black Sea on the east (Map: Balkan Peninsula, E 3). Area, about 13,700 square miles. The central part is occupied by a wide plain intersected in a southeastern direction by the valley of the Maritza, the principal river of the province. In the southwest are the Rhodope Mountains. The valleys along the tributaries of the Maritza in the Balkan chain are known for their rose gardens. Good tobacco is grown on the northern slopes of the Rhodope. The chief town is Philippopolis. The population of the province in 1900 was 1,091,854, mostly Bulgarians.

The annual sum of $569,843 is paid by Bulgaria to the Porte as tribute for Eastern Rumelia. For further information, see BULGARIA.

RÜMELIN, rü'me-lên, GUSTAV (1815-89). A German statistician and author, born at Ravensburg, Württemberg. After studying theology at Tübingen, he devoted himself to teaching, became rector of a Latin school in 1845, and professor at the gymnasium of Heilbronn in 1849, having in the meanwhile been a delegate to the Frankfort Parliament in 1848. Called to Stuttgart in 1850 to serve in the Board of National Education, he was head of a department in the Ministry of Public Instruction from 1856 to 1861, when he became director of the Statistic-Topographical Bureau. In 1867 he established himself as docent at the University of Tübingen and was appointed its chancellor in 1870. Aside from various statistical and miscellaneous publications, he produced *Shakespeare-Studien* (2d ed. 1874), a much valued contribution to the Shakespeare literature.

RUM'FORD, BENJAMIN THOMPSON, Count (1753-1814). An American physicist, born at Woburn, Mass. He entered a merchant's office at Salem at the age of thirteen, at the same time studying medicine and physics. In 1772 he married a rich widow of that place, and was made major of militia by the English Governor. The distrust of the colonists at this period of the outbreak of the American Revolution drove him to Boston, and when Washington compelled the evacuation of Boston, Thompson was sent to England as bearer of dispatches. In London he won the favor of the Government and received an appointment in the Colonial Office and was soon afterwards made Under Secretary of State. Continuing, at the same time, his scientific investigations, he was elected, in 1779, Fellow of the Royal Society. On the resignation of North's Ministry he returned to America, and fought for the royal cause. At the end of the Revolutionary War he obtained permission from the British Government to enter military service in Bavaria, and in 1784 he was settled at Munich as aide-de-camp and chamberlain to the reigning sovereign. He rapidly rose to the ranks of major-general, councilor of State, lieutenant-general, Minister of War, and was created count of the Holy Roman Empire, when he chose Rumford (now Concord, N. H.), where his fortunes had begun, as his titular designation. In 1795 he visited London, where he published the results of his experience and the records of his labors in Bavaria. Having long and carefully studied the phenomena of heat, he set himself to devise a remedy for the smoky chimneys which were one of the greatest nuisances at that time in England, and discovered the principles upon which fireplaces and chimneys have since been constructed. In 1799 he retired from Bavarian service and returned to London, where, at his instance, the Royal Institution was founded in the following year. He finally settled in Paris; devoted himself to improvements in artillery and illumination; founded a professorship in Harvard College of the application of science to the arts of living; married the widow of Lavoisier, and died at Auteuil, near Paris, after making many important bequests to the Royal Society of London, the American Academy of Sciences, and Harvard University. A memoir of Rumford by George E. Ellis was published, with a complete edition of his works, in 1872 (Boston). Rumford is chiefly remembered for his experiments on the nature of heat. In 1798 he showed that the temperature of a body may be raised without heat being communicated to it as such; that the heat contained, for instance, in a metallic body may be increased by boring. On the basis of this fact he maintained, in his *Enquiry concerning the Source of Heat which is excited by Friction* (read before the Royal Society on January 25, 1798), that heat is not an imponderable substance, as it was generally assumed to be in those days.

RUMINANT (from Lat. *ruminare*, to chew the cud, from *rumen*, throat, gullet; connected with *ructare*, Gk. ἐρεύγειν, *ereugein*, OChurch Slav. *rygati*, to belch, Lith. *atrugas*, eructation, AS. *roccettan*, to belch). One of the group of large grazing animals which chew a cud, classified by Cuvier as an order (Ruminantia), but now regarded as a group of the suborder Artiodactyla, the cloven-hoofed or even-toed Ungulata (q.v.). The ruminants include all of the cloven-hoofed herbivores except the swine and hippopotamus, that is the chevrotains, camels, deer, giraffes, cattle, antelopes, sheep, goats, musk-ox, and some extinct families. All these are alike in that their dentition and digestive organs are adapted to that peculiar method of mastication called 'chewing the cud.' Except the camels, they have no incisors in the upper jaw, the front of which is occupied by a callous pad. The grass is collected and rolled together by means of the long tongue; it is firmly held between the lower cutting teeth and the pad, and then torn and cut off. In the lower jaw there generally appear to

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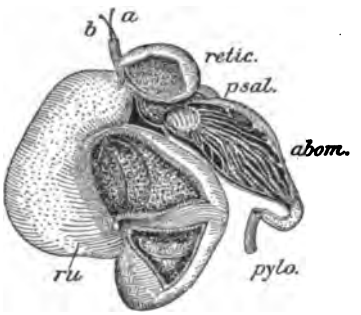
be eight incisors; but the two outer are more properly to be regarded as canines. In front of the molar teeth there is a long vacant space (diastema) in both jaws. The molars are six on each side in each jaw; their surface exhibits crescent-shaped ridges of enamel—that is, they are of the solenodont type. See TEETH; and illustration of cow's skull, under CATTLE.

The stomach is composed of four distinct bags or cavities, except in the chevrotains, where the third is absent. In the camels the stomach is imperfectly divided into four chambers and has special peculiarities. (See CAMEL.) In all ruminants the first pouch of the stomach, into which the gullet leads, is, in the mature animal, by far the largest and is called the *paunch* or *rumen*. Into this the food first passes. It is lined with a thick membrane, presenting numerous prominent hard papillæ, secreting a fluid in which the food is soaked. The second cavity is the *honeycomb bag*, or *reticulum*, so called from its being lined with a layer of chambers like those of a honeycomb. The second pouch has also a direct communication with the œsophagus, and fluids pass immediately into it, but sometimes or partly also into the other cavities. The third pouch is the *manyplies* or *psalterium*, so called because its lining membrane forms many deep folds, like the leaves of a book, beset with small, hard tubercles. This also communicates directly with the œsophagus, by a sort of prolongation of it. The fourth pouch, which is of



STOMACH OF A RUMINANT.

a, b, probes in the gullet; *retic.*, reticulum, *psal.*, psalterium; *abom.*, abomasum: *ru*, rumen (paunch); *pylo.*, pylorus.

more elongated form than any of the others, and is second in size, is called the *reed* or *rennet*, or *abomasum*. It is lined with a velvety mucous membrane in longitudinal folds, and here the gastric juice is secreted. In young animals it is the largest of the four cavities, and it is only when they pass from milk to crude vegetable food that the paunch becomes enlarged, and all the parts of the complex stomach come fully into use. The food consumed passes chiefly into the first cavity, but part of it also at once into the second (as the animal wills), and when in a mashed or in a much comminuted state, into the third. When the paunch is well filled and the animal is at rest, it begins the process called *chewing the cud* or ruminating. This may occur while the animal is standing, but more commonly when lying down. The first step is a spasmodic movement of the paunch and diaphragm like a hiccough and a reversal of the peristaltic movement of the œsophagus, by which a ball of food is brought up into the mouth from the rumen or reticulum. It is then chewed steadily for some time until thoroughly mixed with the saliva, when it is reswallowed, but passes by the first two pouches and enters the psalterium, from which it goes on into the abomasum and intestine, which in this group is always long, as also is the cæcum. For an account of the evolution of this apparatus and the ruminant habit, see ALIMENTARY SYSTEM, EVOLUTION OF.

The head of the ruminant is elongated, the neck is always of considerable length, the eyes are placed at the side of the head, and the senses of smell and hearing, as well as of sight, are extremely acute. The head in many ruminants is armed with horns, which in some are found in both sexes, in some only in the male, while in others they are entirely wanting. The ruminants are generally gregarious; they are distributed over almost the entire world, even in the coldest regions, but none are natives of Australia and comparatively few occur in America. Africa is the home of most of the species. The group is divisible into three sections: (1) Tragulina, embracing the chevrotains (Tragulidæ), which are the oldest ruminants, going back to the Eocene and Oligocene, and the extinct family Protoceratidæ of the Miocene of America, which resemble the ancestral tragulines; (2) Tylopoda, including the camels; and (3) Pecora, or horned ruminants, composed of the deer (Cervidæ), giraffes (Giraffidæ), pronghorns (Antilocapridæ), cattle, sheep, and goats (Bovidæ), and certain fossil forms. The flesh of most of the ruminants is fit to be used for human food; the fat (tallow) hardens more on cooling than the fat of other animals, and even becomes brittle. The fat, hide, horns, hoofs, hair, bones, entrails, blood, and almost all parts are useful to man.

RUMP PARLIAMENT. The name given in English history to the remnant of the Long Parliament after the expulsion of the Presbyterian members by a body of soldiers under Thomas Pride (q.v.), on December 6, 1648. This remnant, fifty or sixty members belonging to the Independent Party, nominated a High Court of Justice of 135 members—of whom one-half refused to serve—to try the King for high treason. After the King's execution, the Rump abolished the House of Lords and established the Commonwealth, itself playing the rôle of Parliament, though it was in no sense representative. It sent Cromwell to establish its authority in Ireland and Scotland, passed the Navigation Act (1651), and began the Dutch war (1652). Cromwell dissolved it by force on April 20, 1653. During the disorders which followed Cromwell's death, the Rump was restored by the army, May 7, 1659, but upon its quarreling with the military leaders, was again dissolved, October 13th, only to be recalled in December of the same year. On February 21, 1660, Monk recalled the Presbyterian members who had been expelled by Pride's Purge, and the Long Parliament, thus restored, issued writs for a new free Parliament and voted its own dissolution on March 16, 1660. See bibliography under LONG PARLIAMENT.

RUMSEY, rŭm'zĭ, JAMES (1743-92). An American mechanical engineer, born in Maryland. After applying himself to the study of mechanics and machinery, he became an inventor. In 1786, twenty-one years before Fulton built the *Cler-*

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mont, Rumsey exhibited on the Potomac, in the presence of Washington, a boat propelled by machinery, in which a pump worked by steam power drove a stream of water from the stern, and thus furnished the motive power. This idea, which originally was proposed by Bernouilli, has since figured in many schemes for propelling vessels. A society was formed to aid his project, of which Franklin was a member. He visited and gave exhibitions in England, and obtained patents for his invention in Great Britain, Holland, and France. His death occurred while he was preparing for further experiments. He also made improvements in mill machinery, and in 1788 published a *Short Treatise on the Application of Steam.*

RUN (AS. *rinnan, eornan, irnan, iernan, yrnan*, Goth., OHG. *rinnan*, Ger. *rinnen*, to run). In music, a rapid passage executed on one syllable. A run is merely an embellishment, in no way essential to the melodic outline. Runs are also frequently introduced in instrumental music. See GRACE-NOTES; PASSAGE.

RUNCORN. A river-port in Cheshire, England, on the Mersey, 12 miles southeast of Liverpool (Map: England, D 3). The town is the terminus of the Bridgewater and the Mersey and Irwell canals. It has iron foundries, chemical works, ship-building yards, tanneries, etc. In the vicinity are collieries and slate and freestone quarries. Large quantities of freestone are shipped and it is the greatest centre of canal traffic in England. Its shipping returns are included in those of Manchester. A viaduct 1500 feet long and 95 feet above high water crosses the Mersey here. A castle was built here in 916, and the Runcorn ferry is mentioned in the twelfth century. Population, in 1891, 20,050; in 1901, 16,490.

RUNEBERG, rōō'ne-bĕrk, JOHAN LUDVIG (1804-77). A celebrated Swedish poet of Finland. He graduated at the University of Åbo, and was successively lector in Latin literature at the University of Helsingfors, editor of the *Helsingfors Morgonblad*, and lector at the Borga gymnasium. His first publication was lyric *Dikter* (Poems, 1830), followed by the *Grafven i Perrho* (*The Grave in Perrho*, 1831), and by *Elgskyttarne* (*The Elk-Hunters*, 1832), the fine epic which confirmed his fame. His further works number *Nadeschda* (1841); *Kung Fjalar* (*King Fjalar*, 1844), an unrhymed epic of ancient Norse times; *Fänrik Ståls Sägner* (*Ensign Ståls Stories*, 1848 and 1860), a series dealing with the war of independence of 1808; and *Kungarne på Salamis* (*The Kings at Salamis*, 1863), a stately tragedy in the true Greek manner. He is classic in simplicity and finish, free from the conventionalities of the time, and not lacking in a certain quaint humor. There is an edition of his collected writings (6 vols., 1873-74), which contains the completest biography yet written.

RUNES (AS. *rūn*, letter, writing, mystery, Goth. *rūna*, OHG. *rūna*, mystery, secret). The earliest alphabet in use among the Germanic peoples. In Old Norse, magic signs, as well as magic charms, are designated as runes. There is nothing in the meaning of the word to have prevented it from being chosen by the primitive Teutons as their designation of the alphabet in general, since the mysterious connection between spoken sound and written symbol is sufficient to justify such a name. The use of runes for incantations and magic formulas is easily explicable. The magic power was easily transferred from the contents of these incantations to the signs themselves. Scandinavian and Anglo-Saxon tradition agree in ascribing the invention of runic writing to Odin or Woden. The countries in which traces of the use of runes exist include Denmark, Norway, Sweden, Ireland, Germany, Great Britain, France, Spain, and Rumania. They are found engraved on rocks, monumental stones, crosses, coins, house utensils, tools, buckles, rings, combs, heads and shafts of spears, and hilts and blades of swords. Especially important are the runes on the so-called bracteates, thin golden plates, chased on one side, and used as neck-wear. The inscriptions on articles of use contain generally the name of, or a brief account of, the maker or owner of the article. Rune inscriptions on stone are found only in Scandinavia and England. The most noteworthy English runes are on a pillar in Bancastle in Cumberland, on a cross in Ruthwell in Dumfriesshire, and on a casket in the British Museum (Franks casket, or Clermont casket).

In the Icelandic sagas the so-called Revels or rune staves are mentioned frequently as bearers of epistolary communications. The sagas report further that rune poems were carved on these staffs. The oldest and most frequent reports of Norse literature, however, show that runes were carved on staves and utensils for divinations, spells, magic, and incantations. Runic manuscripts occur only in Scandinavia, the oldest of them being as late as the thirteenth century. Under the influence of the Church, Latin script in general supplanted the runes as a literary medium, although they remained in use in Scandinavia among the lower classes, especially in the rune calendars which have survived up to the present day. In the Anglo-Saxon kingdoms of Northumbria, Mercia, and East Anglia, there are traces of runic writing dating from the middle of the seventh to the middle of the tenth century. In Spain runic writing was officially condemned by the Council of Toledo in 1115.

The date of the origin of runes is not known, but it is generally assumed not to be later than the second century A.D. Probably their origin is from a much earlier time, and some suggest a date as early as B.C. 600. The earliest truly historical date, however, is the fourth century A.D., when the Gothic Bishop Ulfilas (q.v.), in devising the Gothic alphabet, borrowed his signs for *u* and *o* from the runic alphabet. The question of the source of the runic alphabet is still not altogether settled. The ordinarily accepted view is that of an exclusive derivation of the runes from the Latin alphabet. In 1898 the theory was presented that the runes were invented by Goths in Southeastern Europe a few years after their expedition of 267 into Asia Minor. An alphabet used by Galatian Celts is then regarded as the source, which in turn was based upon the Greek and Latin alphabets. Very much more probable is the view that the runes are based not directly upon the Latin, but on a Western Greek alphabet. It may even be possible that more than one form of Greek writing passed to the Germanic peoples.

The special modifications of the runic alphabet are partly due to the needs of carving on wood,

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and engraving on metal or stone; partly to the difference in the sounds of the Teutonic language and the unlearned primitive rendition of distant models. Some of the sounds have remained obviously Greco-Italic, as

ᚠ = F, ᚱ = R, ᚺ = H, and ᛊ = S.

Others deviate more or less, as

ᛏ = T, ᛗ = M, or ᚾ = N.

The different systems of runes, about a dozen varieties in all, accord up to a certain point. They may be classed under three main divisions, German, Norse, and Anglo-Saxon. The Norse runes exhibit an especially marked division into two alphabets, an earlier one of 24 characters, and a later one of 16. These latter correspond to our *f, u, th, a, r, k, h, n, i, a, s, d, b, l, m, y*, but there is no equivalent for various sounds which existed in the language. In consequence of this the sound of *k* was used for *g*, *d* for *t*, *b* for *p*, and *u* and *y* for *v*; *o* was expressed by *au*, and *e* by *ai*, *i*, or *ia*. Expedients came, in the course of time, to be employed to obviate the

RUNIC ALPHABET.

—	I.	II.	III.	IV.	V.	VI.	VII.	VIII.	—	IX.	X.	XI.	XII.
1. *f*	ᚠ	ᚠ	ᚠ *fé*	ᚠ *feu*	ᚠ	ᚠ	ᚠ	ᛚ	*f*	ᚠ	ᚠ *fioh*	ᚠ *fe, fech*	*fe*
2. *u*	ᚢ	ᚢ	ᚢ *úr*	ᚢ *ûr*	ᚢᚢ	ᚢ	ᚢ	ᚿ	*u*	ᚢ	ᚢ *úr*	ᚢ *úr*	*uraz*
3. *þ*	ᚦ	ᚦ	ᚦ *þurs, þorn*	ᚦ *thuris*	ᚦ ᚦ (ᚦ-ð)	ᚦᚦ	ᚦᚦ	ᛁ	*þ*	ᚦ	ᚦ *þorn*	ᚦ *đorn*	*thyth*
4. *a*	ᚬ	ᚬ	ᚬᚬ *óss*	ᚬ *ôs*	ᚬ ᛅ (-o, ᛅ-ø)	ᚬ	ᚬ	_	*o*	ᚭ	ᚭ *ós*	ᚭ *ós*	*aza*
5. *r*	R(ᚱ)	ᚢ	ᚱ *reið*	ᚱ *rât*	ᚱ	ᚱ	ᚱ	ᚲ	*r*	ᚱ	ᚱ *rád*	ᚱ *rêda*	*reda*
6. *k*	ᚲ(ᛦ, ᛦ)	ᚲ	ᚴ *kaun*	ᚴ *chaon*	ᚴ	ᚴ	ᚴ	ᛣᛣ	*k*	ᚳ	ᚳ(ᚴ) *cén*	ᚳ *cên*	*chozma*
7. *g, j*	ᚷ	ᚷ	—	—	ᚴ	—	—	—	*g'*	ᚷ	ᚷ *gifu*	ᚷ *geofu*	*geuua*
8. *w*	ᚹ(ᚹ)	ᚹ	—	—	ᚴ	—	—	—	*w*	ᚹ	ᚹᚹ *wenn(wein)*	ᚹ *wyn*	*uuinne*
9. *h*	ᚺ(ᚻ)	ᚺ	ᚺᚻ✱ *hagall*	✱ *hagal*	✱	ᚼ	ᚼ	ᚾ	*h*	ᚺ	ᚺᚼᚺ *hægl*	ᚺ *hægil*	*haal*
10. *n*	ᚾ(ᚿ)	ᚾ	ᚾ *nauð*	ᚾ *naut*	ᚾ	ᚾ	ᚾ	ᛜ	*n*	ᚾ	ᚾᛜ *nýd*	ᚾ *nêd*	*noicz*
11. *i*	ᛁ	ᛁ	ᛁ *íss*	ᛁ *îs*	ᛁ	ᛁ	ᛁ	ᛁ	*i*	ᛁ	ᛁ *is*	ᛁ *is*	*iiz*
12. *j*	(ᛋ)ᛄ	ᛋ	ᛋ✱ᛏ *ár*	ᛏ *âr*	ᛏ (-a, ᛏ-æ)	ᛏ	ᛏ	ᛃ	*j*	ᛏ	ᛏ (ᛏ) *gár*	ᛏ *gâer*	*gaar*
13. *hv*[2]	ᛚ	ᛊ	—	—	—	—	—	—	*ʔ*	ᛚ	ᛊᛊ *éoh*	ᛊ *îh*	*uuaer?*
14. *p*	ᛈ	ᛘ	—	—	ᛈ B	—	—	—	*p*	ᛕ	ᛕ *peorð*	ᛕ *peord*	*pertra*
15. *z, ʀ*	ᛉ	ᛝ		—	—				*x*[1]	ᛉ	ᛉ(ᛝ) *colhæg*	ᛉ *ilcs*	*ezec?*
16. *s*	ᛊ(ᛋ)	ᛋ	ᛋᛋ *sól*	ᛋ *sôl*	ᛋᛁ	ᛁ	ᛁ	ᛁ	*s*	ᛁ	ᛋ(ᛋ) *sigel*	ᛋ *sygil*	*sugil*
17. *t*	ᛏ	ᛏ	ᛏ *týr*	ᛏ *tîu*	ᛏᛏ	ᛏᛏ	ᛚ	ᛙ	*t*	ᛏ	ᛏ *tir*	ᛏ *ti*	*tyz*
18. *b, ð*	ᛒ(B ᛒ)	ᛒ	ᛒ *bjarkan*	ᛒ *brica*	ᛒ B	ᛒ	ᛒ	.	*b*	ᛒ	B *beorc*	ᛒ *berc*	*bercna*
19. *e*	M	M	—	—	ᛗᛗ	—	—	—	*e*	M	M *eh*	M *eh*	*egz*
(22. *æ*)	—	—	—	—	—	—	—	—	(*æ*)	ᛝ	—	—	—
(21. *l*)	—	—	—	—	ᚴ	—	—	—	—	—	—	—	—
20. *m*	M(ᛗ)	M	ᛘᛘᛘ *maðr*	ᛘ *man*	ᛘᛘ	ᛘᛘ	ᛘ	ᛘ	*m*	M	M *man*	M *mon*	*manna*
21. *l*	ᚴ	—	ᚴ *lögr*	ᚴ *lagu*	—	ᚴ	ᚴ		*l*	ᚴ	ᚴ *lagu*	ᚴ *lagu*	*laaz*
22. *ŋ*	ᛜ(ᛜ ᛜ)	—	—	—	—	—	—	—	*ŋ*	—	ᛝᛝ *ing*	ᛝ *ing*	*enguz(-x)*
23. *o*	ᛟ	—	—	—	—	—	—	—	*œ*	—	ᛟ *épel*		*utal*
24. *d, ð*	(ᛞᛞ)	—	—	—	ᛏᛏᛏ	—	—	—	*d*	M	M *dæg*	M *daeg*	*daaz*
(15. *ʀ*)	—	—	ᛦᛦ *ýr*	ᛦ *ýr*	ᛦ(ᛦ. *g*)	ᛁ	ᛁ	ᛁ	—	—	—	—	—
(23. *o*)	—	—	—	—	—	—	—	—	(*œ*)	ᛟ	—	ᛟ *óedil*	—
25.	—	—	—	—	—	—	—	—	*a*	ᚪ	ᚪ *ác*	ᚪ *ác*	—
26.	—	—	—	—	—	—	—	—	*æ*	ᚫ	ᚫ *æsc*	ᚫ *aer*	—
27.	—	—	—	—	—	—	—	—	*y*	ᚣ	ᚣ(ᚣᚣᚣ) *ýr*	—	—
28.	—	—	—	—	—	—	—	—	*eo*	—	ᛇ *íar*	—	—
29.	—	—	—	—	—	—	—	—	*ea*	ᛠ	ᛠ *ear*	ᛠ *eor*	—
(27.)	—	—	—	—	—	—	—	—	(*y*)	—	—	ᛦ *ýr*	—
30.	—	—	—	—	—	—	—	—	*q*	—	ᛢ *cweorð*	—	*quertra?*
31.	—	—	—	—	—	—	—	—	*st*	—	ᛣ *stán*	—	—
32.	—	—	—	—	—	—	—	—	*g*[2]	—	ᛤ(ᛤ) *gár*	—	—

I. Alphabet of the oldest Norse inscriptions. II. Alphabet of the fibula of Charnay. III. Alphabet of the later Norse inscriptions. IV. Norman abecedarium. V. Alphabet of the latest Norse inscriptions. VI. Alphabet of the stone of Rök. VII. Alphabet of the ring of Forsa. VIII. Runes of Helsing. IX. Alphabet of the Thames knife. X. Alphabet of the Anglo-Saxon rune-song. XI. Anglo-Saxon alphabet of the Salzburg manuscript. XII. Names of the Gothic letters in the Salzburg manuscript.

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deficiency of the system, as the addition of dots and the adoption of new characters. The runic system received a fuller development among the Germans and Anglo-Saxons, particularly the latter, whose alphabet was extended to something like 40 characters, which seem to have embraced, more nearly than any modern alphabet, the actual sounds of the language.

The runic signs are arranged in an order apparently quite distinct from that of any other alphabetical system, and have a purely Teutonic nomenclature. Each letter is, as in the Hebrew-Phœnician, derived from the name of some well-known familiar object, with whose initial letter it corresponds. The direction of the writing is both from left to right and from right to left, and occasionally also boustrophedon (q.v.). The full Old Norse alphabet of 24 signs is divided into three octads, traces of which are found also with other runic alphabets. The alphabet is often called Futhark or Futhorc, based on the usual abecedarium of the first five characters. The futhark, in its series *p*, *z*, (*r*), *s*, *t*, distinctly exhibits the usual alphabetic arrangement. It is probable that *f* and *a* exchanged places owing to the similarity of their signs, while *b* (pronounced something like *v*) and *u* changed places because they were similar in sound. A number of other reasonable assumptions of interchange and displacement bring back the majority of the runes to the order in which they should be expected, since they originate from the common source of alphabets.

In the accompanying table, taken from the monograph of Sievers on the runes in Paul's *Grundriss der germanischen Philologie*, the variations and development of the runic alphabets may be traced.

The Celtic races, from their connection with the Scandinavians, became acquainted with their alphabet and made use of it in writing their own language; hence there are in the western islands of Scotland, and in the Isle of Man, runic inscriptions, not in the Anglo-Saxon, but in the Norse character, with, however, peculiarities. Some of the most perfect runic inscriptions are in Man, others of a similar description exist at Holy Island, in Lamlash Bay, Arran, and there is an inscription in the same character on a remarkable brooch, dug up at Hunterston, in Ayrshire.

BIBLIOGRAPHY. The study of the runes may be commenced most handily with the compact treatise of Sievers, *Runen und Runen-Inschriften*, in Paul, *Grundriss der germanischen Philologie* (2d ed., vol. i., Strassburg, 1901). The grammar of the Norse runes is treated by Noreen in the same volume of the *Grundriss*. The standard work on the Norse runes is Wimmer, *Runeskriftens Oprindelse og Udvikling i Norden* (Copenhagen, 1874), German translation by Holthausen, enlarged, *Die Runenschrift* (Berlin, 1887); Stephens, *The Old Northern Runic Monuments of Scandinavia and England* (London, 1866-84), contains the fullest collection of plates, although the explanations are untrustworthy. His *Handbook of the Old Northern Runic Monuments* (London, 1884) is a condensed treatment of the same subject. The first two volumes of Wimmer's work, *De Danske Runemindesmaerker*, to be completed in four volumes, appeared in Copenhagen in 1895 and 1901. The standard treatment of the Norwegian runes is Bugge, *Norges Indskrifter med de ældre Runes* (Christiania, 1891 et seq.). An important work on the Norse runes is Burg, *Die älteren nordischen Runeninschriften* (Berlin, 1885). The principal work on the Continental (German) runes is Henning, *Die deutschen Runendenkmäler* (Strassburg, 1889). A standard discussion of the most important of the English runes, including a grammar and glossary, is Vietor, *Die northumbrischen Runensteine* (Marburg, 1895). The Manx runes are discussed in Kermode, *Catalogue of the Manx Inscriptions* (2d ed., Ramsay, 1892).

RUNJIT SINGH, rŭn-jĕt′ sĭng′h'. A Hindu Maharaja. See RANJIT SINGH.

RUNKLE, rŭŋ′k'l, JOHN DANIEL (1822-1902). An American mathematician, born at Root, Montgomery County, N. Y. He graduated in 1851 at the Lawrence Scientific School of Harvard University, from 1849 to 1884 was an assistant in the editorial staff of the *American Ephemeris and Nautical Almanac*, and was professor of mathematics in the Massachusetts Institute of Technology from the opening of the institution in 1865 until his retirement as professor emeritus in 1902. He was also acting president of the Institute in 1868-70 and its president from 1870 to 1878. Manual training was introduced into the Institute curriculum largely at his instance. He founded the *Mathematical Monthly* in 1859, and continued its publication until 1861. His publications include: *The Manual Element in Education* (1882), reprinted from the *Reports* of the Massachusetts Board of Education; *Report on Industrial Education* (1883); and *Elements of Plane and Solid Analytic Geometry* (1888).

RUNNING SPIDER. A spider of the family Lycosidæ. They are long-bodied and hairy, but in size are smaller than the trap-door spiders, which they sometimes resemble. Their colors are usually black and white, or brown and gray, and in general simulate the coloring of their surroundings. The females carry their eggs in round cocoons attached to their spinnerets, and the young, after issuing from the eggs, are for a short time carried on the back of the mother. Most of the North American species belong to the genera Lycosa and Pardosa. Consult Emerton, *The Common Spiders of the United States* (Boston, 1902).

RUNNYMEDE. A pseudonym of Disraeli, in "The Letters of Runnymede" (1836).

RUNNYMEDE, rŭn′nĭ-mēd, or **RUNNIMEDE.** A long stretch of green meadow, lying along the right bank of the Thames, 20 miles west of London. It is of great historical interest, from the fact that Magna Charta was signed by King John, June 15, 1215, either on this meadow, or on Charter Island, lying a short distance off the shore.

RUPEE (Hind. *rūpīya*, *rupīya*, from *rūpa*, silver, from Skt. *rūpya*, silver, from *rūpa*, natural state, form, beauty). A silver coin, the general unit of value in India. Rupees were first coined in 1542. The fineness and value have varied at various times and in the different portions of the country. The Madras rupee of 11.664 grammes $\frac{11}{12}$ fine was adopted in the Presidency of Bombay soon after 1818 as the 'Company's rupee.' The value of the rupee in 1903 was

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about 32 cents, the coin passing in India at 15 to the pound sterling. The rupee is legally divided into 16 annas of 12 pies, but various other divisions are still current throughout the country. In addition to the one-rupee pieces, half, quarter, and eighth rupees are coined.

RU'PERT (or RUPRECHT), SAINT (?-717). 'The apostle of the Bavarians,' a descendant of the royal family of Franks. In 694, when he was Bishop of Worms, he was invited by Theodor II. to preach in Bavaria, and he baptized Theodor and many other nobles. He settled afterwards in Salzberg, where he built an episcopal residence. The Church celebrates both the day of his death, March 27th, and that of the transportation of his relics, September 24th. The oldest biography of Rupert, written in the tenth century, *Gesta Sancti Hrodberti Confessoris*, is still preserved in the University library of Gratz. It was published in the *Archiv fur österreichische Geschichte* (1882, vol. lxiii).

RUPERT, PRINCE (1619-82). A nephew of Charles I. of England, and his ablest cavalry leader in the Civil War. He was born at Prague, December 17, 1619, the son of the Elector Palatine Frederick V., who had been crowned King of Bohemia, and his wife, Elizabeth, the daughter of King James I. of England. He served in the Thirty Years' War on the Protestant side in the Netherlands and in Westphalia, and in 1638 he was taken prisoner, but secured his release in 1642 in time to take service under Charles I. at Nottingham. He was given command of the cavalry, at that time the most important arm of the royal service, and he fought impetuously and successfully at Worcester, Edgehill, and Brentford in 1642. In 1643 he made himself master of Bristol. He took part in the disastrous battles of Marston Moor (1644) and Naseby (1645). His petulant disregard of orders, and his surrender of Bristol in September, 1645, so angered the King that he was deprived of his command and requested to leave England without delay. He declined to do so and submitted to a court-martial, which only partially acquitted him. After Charles's cause became hopeless Rupert entered the French service, but in 1648 received the command of the English Royalist fleet. In this new position he acquitted himself with considerable credit, and for nearly three years he kept his ships afloat, escaping the blockade in which he had been held off the Irish coast by Blake, the great admiral of Parliament. In January, 1651, however, the latter attacked the Prince's squadron at Malaga and burned or sank most of his ships. With the few vessels still remaining to him, Rupert escaped to the West Indies, where, together with his brother Maurice, he led a buccaneering life. After the loss of his brother at sea, Rupert went again in 1653 to France, and spent his time in that country and in Germany until the Restoration in 1660, when he returned to England and served on sea against the Dutch in the wars of that period. He died on November 29, 1682. The last ten years of his life were spent in retirement in the pursuit of chemical and other researches, for which he evinced considerable aptitude. Although it is certain that he did not discover the art of engraving in mezzotint—the real inventor of which appears to have been a German, Von Siegen—Rupert did much to make the art widely known. Consult: Warburton, *Memoirs of Prince Rupert and the Cavaliers* (London, 1849); Gower, *Rupert of the Rhine* (ib., 1890); Scott, *Rupert, Prince Palatine* (Westminster, 1899).

RUPERT'S DROP. See PRINCE RUPERT'S DROPS.

RUPERT'S LAND. A name formerly applied to the Canadian territory lying around Hudson Bay. The region was named in honor of Prince Rupert (q.v.), the first Governor of the Hudson Bay Company, to whom it was granted by his cousin, Charles II.

RUPIA (Neo-Lat., from Gk. *ῥύπος*, *rhypos*, dirt, filth). A severe skin disease of chronic type characterized by flat, discrete blebs about an inch in diameter, containing serous, purulent, or bloody fluid, which finally dry into thick scabs. The scabs separate and fall off, and new crops appear. The disease usually attacks the loins, buttocks, and extremities. It is not contagious. It usually appears in the aged, feeble, or depleted, and often occurs as a sequel of one of the exanthemata. Tonics, iodides, mineral acids, and quinine are efficacious, together with nitrate of silver applied topically. In spite of all treatment the disease is of long duration.

RUPP, rup, JULIUS AUGUSTUS LEOPOLD (1809-89). A German theologian and one of the founders of the 'free congregations' (q.v.). He was born at Königsberg and studied theology there. In 1830 he was appointed to lecture on philosophy at the university of his native town, and for several years he was preacher at the Royal Chapel in Königsberg. His liberal spirit involved him in trouble with the Consistory, and as a result of these differences Rupp became leader of the free Church movement, the programme of which he published in his *Der Symbolzwang und die protestantische Gewissens- und Lehrfreiheit* (1843). For a sermon against the Symbolum Athanasianum, he was deprived of his benefice by the Consistory, and when elected preacher by the German Reformed Church in Königsberg, the royal confirmation was refused. This led him to form at Königsberg in 1846 a 'free congregation,' the leader of which he continued to be till he retired from public life. Rupp wrote, among other works, *Gregors, des Bischofs von Nyssa Leben und Meinungen* (1834).

RÜPPELL, rup'pel, EDUARD (1794-1884). A German naturalist and explorer, born at Frankfort-on-the-Main. Under the auspices of the Senckenberg Museum he explored Northeast Africa in 1822-27, and Abyssinia in 1830-34. His *Reise in Abessinien* (1838-40) was a valuable contribution to African geography and won a gold medal from the London Geographical Society.

RUPTURE. See HERNIA.

RURAL DEAN (Lat. *ruralis*, relating to the country, from *rus*, country). The title of an ecclesiastical officer, such as was known in the early ages of the Church as an archipresbyter, whose duty it is to exercise a certain oversight, under the bishop, within a small subdivision of a diocese. He obtained his title of Decanus Ruralis about the time of Charlemagne. The office was introduced into England about the year 1052, and developed as need arose. Archbishop Ussher in his scheme for a 'moderate episco-

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pacy' in England, published just before the great rebellion (1640), advocated a plan for making the rural deans a sort of subordinate bishops, analogous to the *chorepiscopi* of earlier times. The office was revived in England during the nineteenth century, and its holders charged with inspection of church work and organization as deputies of the archdeacon or bishop. Some of the dioceses of the Protestant Episcopal Church in the United States have developed a system of rural deaneries in which the clergy meet at stated times in convocation. Similar officials in the modern Roman Catholic Church are sometimes known as rural deans, sometimes as *vicarii foranei*.

RU'RIK. According to Nestor, the earliest Russian chronicler, the leader of a band of Northmen or Varangians, who, in response to an invitation extended by the Slavs of Novgorod, settled in that city in 862. Subsequently, Rurik established himself on Lake Ladoga, while his brothers, Sineus and Truvor, made themselves masters of the country around Lake Peipus and Bielo-ozero. On their death Rurik united the Varangian possessions under his rule. He died in 879 and was succeeded by his son Igor, whose descendants ruled in Russia till 1598, when the royal House of Rurik became extinct in the person of Feodor, son of Ivan IV., and was succeeded by that of Romanoff. Many noble families in Russia still claim descent from Rurik. See RUSSIA.

RUSH, FRIAR. A household sprite, somewhat resembling Robin Goodfellow, in the form of a mischievous demon, who once took service as scullion at a monastery and led the monks into evil ways. The German form of the name, Rausch, meaning intoxication, accounts for his characteristics. In *L'Allegro* and *Marmion* he is confused with Will o' the Wisp.

RUSH, BENJAMIN (1745-1813). An American physician and patriot, born at Byberry (now included in Philadelphia), Pa. He graduated at Princeton, 1760; received his medical degree abroad, and after studying in Edinburgh, London, and Paris was appointed professor of chemistry in the Philadelphia Medical College (now the medical department of the University of Pennsylvania) in 1769. He was elected a member of the Continental Congress, and was a signer of the Declaration of Independence. He founded the Philadelphia Dispensary in 1785; and also, it is said, the "College of Physicians," which seems to have been consolidated with the University of Pennsylvania. He took part in 1780 in the formation of the new State Constitution, and was a member of the Pennsylvania convention for the ratification of the Federal Constitution. In 1789 he resigned his chair in the medical college for that of the theory and practice of medicine. He did efficient work during the yellow fever epidemic of 1793, for which services he received testimonials from European sovereigns. He was appointed treasurer of the United States Mint at Philadelphia in 1799, and retained this position till his death. Rush was a founder of Dickinson College, vice-president of the Philadelphia Bible Society and of the American Philosophical Society, and president of the Philadelphia Medical Society, as well as of the Society for the Abolition of Slavery. He wrote much on medical topics.

RUSH, RICHARD (1780-1859). An American lawyer, statesman, and diplomat, born in Philadelphia, a son of Dr. Benjamin Rush. He graduated at Princeton in 1797, studied law, and was admitted to the bar in 1800. In 1811 he was made Attorney-General of Pennsylvania, in the same year was appointed Comptroller of the United States Treasury, and in 1814 became Attorney-General of the United States. In 1817, after being for a short time Secretary of State, he was sent as Minister to England, where he negotiated a number of important treaties. He returned to the United States in 1825 to become Secretary of the Treasury. Three years later he was a candidate for the Vice-Presidency on the ticket with John Quincy Adams, but was defeated. He became a Democrat in the early thirties, opposed the United States Bank, and ultimately gained considerable influence in the party. In 1835 he assisted in adjusting the boundary dispute between Michigan and Ohio, and next year was sent by President Jackson to England to get the legacy left by James Smithson for the building of the Smithsonian Institution. From 1847 to 1851 he was Minister to France, and he was the first foreign representative to recognize the Republic of 1848. Rush superintended the publication of *The Laws of the Nation* (5 vols., 1815), and wrote: *Narrative of a Residence at the Court of London from 1817 till 1825* (1833); a second volume on the same work, "comprising incidents, official and personal, from 1819 till 1825" (1845; 3d ed. 1873); and *Washington in Domestic Life* (1857).

RUSH'DEN. A manufacturing town in Northamptonshire, England, 4½ miles southeast of Wellingborough (Map: England, F 4). Population, in 1891, 7450; in 1901, 12,460.

RUSH'VILLE. The county-seat of Rush County, Ind., 40 miles southeast of Indianapolis; on Flat Rock Creek, and on the Cincinnati, Hamilton and Dayton, the Cleveland, Cincinnati, Chicago and St. Louis, the Lake Erie and Western, and other railroads (Map: Indiana, D 3). It has a public library and a handsome court house. The city is in an agricultural and horse-breeding section; manufactures furniture, carriages, flour, and lumber products; and carries on considerable trade in grain. The water works and electric light plant are owned and operated by the municipality. Rushville was settled in 1820 and was chartered as a city in 1883. Population, in 1890, 3475; in 1900, 4541.

RUSH'WORTH, JOHN (c.1612-90). An English historian. He was educated, according to Wood, at Oxford, and was called to the bar at Lincoln's Inn in 1647. He spent much time for many years in attending the Star Chamber, the Court of Honour, the Exchequer Chamber, and Parliament, and in making short-hand notes of the proceedings. He performed many important services during the Civil War, the Commonwealth, and the Protectorate; was secretary to Lord Fairfax (1645-48); sat in five Parliaments for Berwick; became secretary (1667) to Sir Orlando Bridgeman, the Lord Keeper; late in life his affairs became embarrassed, and he spent his last six years in the King's Bench Prison, Southwark. Rushworth is known for his *Historical Collections of Private Passages of State, Weighty Matters of Law, Remarkable Proceedings in Five Parliaments*, covering the period from 1618 to

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1648. The work, comprising eight volumes, appeared in four installments (1659, 1680, 1692, 1701). Its historical value was long overestimated; of most value are the shorthand notes taken by Rushworth himself.

RUSK, JEREMIAH MCCLAIN (1830-93). An American farmer, soldier, and political leader, born in Morgan County, O. He was brought up on a farm, received a common school education, and in 1853 removed to Vernon County, Wis. When the war broke out, he raised a regiment to fight for the Union, and, though offered the colonelcy, he refused to accept a higher grade than that of major. His first service was performed against the Minnesota Indians. He then took part in the campaign against Vicksburg, and in August, 1863, was promoted lieutenant-colonel. He was with Sherman in the Meridian campaign, displayed great gallantry in the battles around Atlanta, and for his services at the battle of Salkehatchie, where he led a brigade, was brevetted brigadier-general. He was a member of Congress from 1871 to 1877, and was Governor of Wisconsin from 1882 to 1889. At the Republican National Convention in 1888 he was an unsuccessful candidate for the Presidential nomination. In the following year President Harrison appointed him to the Secretaryship of Agriculture, which had just been made a Cabinet portfolio. He held that position until 1893, and performed his duties with great ability.

RUSK, THOMAS JEFFERSON (1802-56). An American soldier and politician, born in Camden, S. C. He studied law under Calhoun, began practice in Georgia, and in 1834 removed to Texas, where he was a member of the convention which declared Texas independent (1836), acted as Secretary of War, and succeeded Houston in command of the Texan army. From 1838 to 1842 he was justice of the Supreme Court of Texas. He took a prominent part in bringing about annexation, and in 1846 was elected to the United States Senate. He committed suicide during a temporary mental aberration.

RUSK, WILLIAM (1756-1833). An American sculptor, born in Philadelphia. He was the son of a ship carpenter, and at first carved figure heads for vessels. His figureheads done for the American frigates *United States* and *Constitution*, and for other vessels, attracted much attention, and are excellent pieces of modeling. He exhibited several statues at the Pennsylvania Academy in 1812. Two of these, "Exultation" and "Praise," are in Old Saint Paul's Church, Philadelphia. His most meritorious work was a full-length statue of Washington (1814), for Independence Hall, Philadelphia.

RUSKIN, JOHN (1819-1900). An English author, art critic, and reformer, born in London, February 8, 1819. His boyhood and youth he depicted with great charm in *Præterita*. His father, John James Ruskin, a shrewd and artistic Scotchman, was then settled in London, where he prospered as a wine merchant, eventually amassing a fortune of £200,000. The boy was educated at home by his mother. Private tutors taught him Latin, Greek, and French. He studied drawing under Runciman, Copley Fielding, and later with Harding. In verse his masters were Rogers, Byron, and Shelley. He accompanied his father and mother on many tours through England, visiting the lakes, read and wrote verse, sketched, and in 1835 saw the Alps and Italy. Having already published prose and verse in magazines and annuals, he entered Christ Church, Oxford, in 1837. His university course was interrupted by illness. Threatened with consumption, he traveled with his parents in England and on the Continent. At Oxford, where he graduated B. A. in 1842, he won the Newdigate prize with a poem entitled *Salsette and Elephanta* (1839). In 1843 appeared the first volume of *Modern Painters*, the primary design of which was to prove the superiority of modern landscape painters, especially Turner, to the old masters; but in the later volumes (ii., 1846; iii. and iv., 1856; v., 1860) the work expanded into a vast discursive treatise on the principles of art, interspersed with artistic and symbolical descriptions of nature, more elaborate and imaginative than any writer had ever before attempted. *Modern Painters* was revolutionary in its spirit and aim, and naturally excited the aversion and hostility of conservatives. Ruskin's advice to young artists was this: "They should go to Nature in all singleness of heart, and walk with her laboriously and trustingly, having no other thought but how best to penetrate her meaning; rejecting nothing, selecting nothing, and scorning nothing." The immense influence of this great work on art is proved by the fact that the advice to-day would be the merest commonplace.

The first artists to accept Ruskin were a group of young men known as the Pre-Raphaelites (q.v.). Convincing and memorable is his defense of them against popular ridicule in his essay entitled *Pre-Raphaelitism* (1851). To the charge that the brotherhood had no system of light and shade, he replied: "Their system of light and shade is exactly the same as the sun's, which is, I believe, likely to outlast that of the Renaissance, however brilliant." While *Modern Painters* was in progress, Ruskin published other books on art: *The Seven Lamps of Architecture* (1849), *The Stones of Venice* (vol. i., 1851; vols. ii. and iii., 1853), both of which aimed to introduce a new and loftier conception of the significance of architecture. Like the later volumes of *Modern Painters*, they were illustrated by Ruskin himself, an accomplished draughtsman. Still other works on art flowed from his pen: *Lectures on Architecture and Painting* (1854), *Elements of Drawing* (1857), *Political Economy of Art* (1857), and annual notes on the Royal Academy. Meanwhile he had also published *Poems* (1850), the beautiful fairy tale *The King of the Golden River* (1851), and *Notes on the Construction of Sheepfolds* (1851), in which he brought forward a plan for Church unity in England.

However varied Ruskin's writings had been hitherto, they bore a close relation to art. Even his plea for one common Christian fold was inspired by a desire to bring about a spirit favorable to art. But in *Unto This Last* (*Cornhill Magazine*, 1860) the artistic purpose, though present, is less apparent. Here Ruskin began his attack on the 'dismal science' called political economy, to be continued in *Munera Pulveris* (1862-63), *Time and Tide* (1867), and *Fors Clavigera* (1871-84), a series of letters to the workmen of England, far above their heads. To this later period belong also *Sesame and Lilies* (1865), charming essays on literature and other subjects; *Ethics of the Dust* (1866); *The Crown*

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of Wild Olive (1866; complete, 1873); lectures on work, traffic, and the future of England, with an eloquent introduction; *The Queen of the Air* (1869), a study of Greek myths of cloud and storm; *Aratra Pentelici* (1872), on sculpture; *Love's Meinie* (1873), on birds; *Ariadne Florentina* (1873), on wood and metal engraving; *Val d'Arno* (1874), on Florentine art of the thirteenth century; *Mornings in Florence* (1875-77), further studies in Italian art; *Proserpina* (1875-86), studies of wayside flowers; *Deucalion* (1875-83), on rocks; *St. Mark's Rest* (1877-84), a manual on Venetian art; *The Bible of Amiens* (1880-85), intended as the first volume of a history of Christendom for boys and girls; *The Art of England* (1883); *Præterita* (1885-89), a review of his life; a volume of collected poems in 1891; and a large body of other essays. It was his usual custom to publish in parts or to make up his volumes from contributions to the magazines. A famous reprint is *On the Old Road* (1885). For many years Ruskin lectured before large audiences in London, Oxford, Cambridge, Edinburgh, and other places. From 1870 to 1879 he was Slade professor of art at Oxford; in 1883 he was reëlected to the chair, but resigned the next year, owing to ill health. With his fortune, Ruskin reclaimed from squalor several London tenement houses, left him by his father; cleaned the streets between the British Museum and Saint Giles's; opened a tea shop to show that retail trade might be pursued honestly; gave an endowment for a master of drawing at Oxford; founded (1876) Saint George's Guild, a landowning society, with a museum for workmen, at Walkley, near Sheffield (transferred to Sheffield itself, 1890). In these and numerous other charities his fortune dwindled away until his only income was from the sale of his books. This, however, was large, amounting, from 1890 to 1900, to about £4000 a year. He long made his home at Denmark Hill, near London. In 1871 he bought Brantwood, a small estate by Coniston Lake, where he passed his last years, and died January 20, 1900.

As an art critic Ruskin was not generally accepted by artists. In this field his service was rather to awaken in his generation a sense for the beautiful. Of strong ethical temperament, he always insisted that beauty should not be divorced from righteousness. His political economy, tending to socialism, has been attacked by the learned. With all its vagaries, it was a noble plea for the higher things of the mind against utilitarianism. Against railways and factories marring the beauty of English landscape he took a firm stand, and for his age he discovered the beauties of river, cloud, and mountain. In the development of English prose he is likely to have a place as the one who moved prose toward verse without passing the boundary line. Of this new prose no better example could be cited than the "Introduction" to the *Crown of Wild Olive*, with its assonances and grand rhythms.

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RUSS, JOHN DENNISON (1801-81). An American philanthropist, born at Chebacco (now Essex), Essex County, Mass. He graduated at Yale in 1823, studied medicine in America and abroad, and in 1826 began to practice in New York City. In 1827 he took part in the movement in aid of the Greek revolutionists, went to Greece in charge of the brig *Statesman*, conveying supplies, and established at Paros a hospital which he directed during part of the following year. Subsequently he established a larger hospital at Aexamelia, on the Isthmus of Corinth. In 1830, after making himself so useful to the Greek cause that a price of twenty thousand piastres was placed upon his head by Turkish authority, he returned to the United States. In 1832 he began the first systematic instruction of the blind undertaken in the United States, and in that year the New York Institution for the Blind, of which he had been a founder in 1831, began its work largely through his efforts. He invented for the use of the blind a phonetic alphabet, consisting of forty-one characters with twenty-three prefixes and suffixes, and afterwards much improved; a series of mathematical characters, numbering four, instead of the previously existing ten; and maps in raised design. The alphabetic and mathematical characters were not widely used and were soon superseded, but the maps found very extensive application. In 1843 he assisted in the organization of the New York Prison Association. He drafted in 1851 the act of incorporation of the New York Juvenile Asylum, of which he was superintendent in 1851-58.

RUSS, rus, ROBERT (1847—). An Austrian landscape painter, born in Vienna. He studied at the academy there, more especially under Albert Zimmerman, adopting, however, in deviation from his master's tendency, a realistic treatment of his subjects. His principal paintings, executed with remarkable technical skill, include "Court of Fürstenburg, Near Burgeis" (Vienna Museum), "After the Cloudburst" (1883, Rudolphinum, Prague), "Thunderstorm in the Alps" (1889), and "Harbor at Riva" (1896).

RUSSELL, HOUSE OF. A famous English family said to derive its descent from Olaf, the sharp-eyed King of Rerik, in the sixth century, one of whose descendants, Turstain, a Scandinavian jarl, settled in Normandy, on its conquest by the Northmen, and became possessed of the barony of Briquebec, and the castle of Rozel, near Cherbourg. JOHN RUSSELL, first Earl of Bedford (1486-1555), in 1538, was elevated in the peerage by Henry VIII. under the title of Baron Russell of Cheyneys, Buckingham. His son, the second Earl, was a person of eminence in Queen Elizabeth's reign, and, like his father, a Knight of the Garter. Another notable member of the family was EDWARD RUSSELL, Earl of Or-

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ford (1653-1727). He was bred to the sea, and was groom of the bedchamber to the Duke of York, afterwards James II., but retired from Court upon the judicial murder of his cousin Lord William Russell (q.v.). Strenuously supporting the Revolution, he obtained high naval commands from William III., and distinguished himself particularly by his victory over the French fleet at La Hogue in 1692. Of recent members of the family the most celebrated is Lord John Russell (q.v.) (1792-1878).

RUSSELL, Benjamin (1761-1845). An American journalist. He was born in Boston, and was apprenticed to a printer, but before completing his term enlisted in the Revolutionary Army, where he rose to the rank of major. During his service he contributed war news to the Worcester *Spy*. After the war he began the publication of a semi-weekly journal, *The Columbian Sentinel*. This paper he controlled for forty years, and, assisted by Ames, Pickering, Lowell, Higginson, and Cabot as contributors, made it one of the most influential organs of the Federalist Party. He was one of the aldermen of Boston; was a representative to the General Court; State Senator for a number of years; was one of the Governor's Council; and in 1820 was a member of the constitutional convention. He retired from the editorship of the *Sentinel* in 1828, but from 1795 to 1830 published another Federalist paper, the *Gazette*, which also exerted a marked influence on the public opinion of the time.

RUSSELL, Sir Charles Arthur, Baron Killowen (1832-1900). Lord Chief Justice of England, born at Newry, Killowen, County Down, Ireland. He was educated at Trinity College, Dublin, studied law in Lincoln's Inn, was admitted to the bar in 1859, and began practice on the Northern circuit. He won early recognition as an able advocate, and in 1872 became a bencher of Lincoln's Inn and a Queen's commissioner. In 1886 he became Attorney-General in the Gladstone Cabinet, and again held that office from 1892 to 1894. He was counsel for the British claims before the Bering Sea Commission in 1893. Early in the following year (1894) he was made Lord of Appeal in Ordinary and created a life peer with the title of Baron Killowen, and before the close of the year succeeded Lord Coleridge as Chief Justice, being the first Roman Catholic to hold that office since the Reformation. He was one of the strongest advocates of international arbitration, and delivered a remarkable address on that subject before the American Bar Association in 1896. In 1899 he was a member of the Venezuelan Boundary Arbitration Tribunal. For two decades before his death, he was regarded as one of the ablest lawyers in Great Britain, and in an unofficial capacity was known in his conduct of the case of his friend, Charles Stewart Parnell, before the Parliamentary Commission, in which he played a part in exposing the notorious Pigott forgeries published in the *Times*.

RUSSELL, Charles William (1812-80). A Roman Catholic theologian and educator. He was born at Killough, County Down, Ireland; educated at Maynooth College, where he became professor of ecclesiastical history (1845), and president (1857). He wrote *The Life of Cardinal Mezzofanti* (1858); translated Leibnitz's *System of Theology* (1850); compiled with J. P. Prendergast the *Calendar of the State Papers, Relating to Ireland, of the Reign of James I.* (1872-77). He was made a member of the Historical Manuscripts Commission in 1869 and with Prendergast reported on the Thomas Carte manuscripts in the Bodleian Library (8 vols., 1871). Cardinal Newman in his *Apologia* attributes to him the chief share in his conversion to the Roman Obedience.

RUSSELL, David Allen (1820-64). An American soldier, born at Salem, N. Y. He graduated at West Point in 1845, and fought in the Mexican War. At the beginning of the Civil War he entered the volunteer service as colonel of the Seventh Massachusetts Volunteers, which he led through the Peninsular campaign. In 1862 he became a brigadier-general of volunteers, and during the Rappahannock campaign was in command of a brigade of the Sixth Army Corps. He participated in the battles of the Wilderness and Spottsylvania. In 1864 he received the brevet of brigadier-general, and later was active in the operations before Petersburg. He commanded his division in the Shenandoah campaign, was brevetted major-general, and was killed in the battle of Opequan, Va.

RUSSELL, Henry (1813-1900). An English vocalist and song composer, the father of W. Clark Russell. He was born at Sheerness, Kent. In 1833-41 he traveled in the United States and Canada, and gave a series of recitals which became very popular. In 1841 he returned to England, and after a series of successful recitals, began the presentation of an entertainment called "The Far West, or The Emigrant's Progress from the Old World to the New," which did much to stimulate emigration to America. He composed about 800 songs, the most famous of which are "Cheer, Boys, Cheer," "There's a Good Time Coming, Boys," "A Life on the Ocean Wave," "To the West," and "O Woodman, Spare that Tree."

RUSSELL, Irwin (1853-79). An American poet, born in Port Gibson, Miss. He was among the first to turn negro character to literary account. Russell wrote both in correct English and in dialect, and possessed distinct powers of humor and pathos. His verses were collected after his death in *Poems* (1888).

RUSSELL, Israel Cook (1852—). An American geologist, born near Garratsville, N. Y. He graduated at New York University in 1872 and studied for two years at the School of Mines of Columbia University. He was assistant professor of geology at the Columbia University School of Mines from 1875 to 1878, and in the latter year was assistant geologist to the United States Geological Survey west of the 100th meridian. In 1880 he was appointed geologist of the United States Geological Survey. In that capacity he made numerous explorations and surveys in the southern portion of the Appalachians, west of the Rocky Mountains, and in Alaska. In 1890-91 he conducted to the Mount Saint Elias region expeditions which made valuable contributions both to geography and geology. He was appointed to the chair of geology in the University of Michigan in 1892. His more important works include: *Geological History of Lake Lahontan* (1885); *Lakes of North America* (1895); *Gla-*

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ciers of North America (1897); and *Rivers of North America* (1898).

RUSSELL, JAMES EARL (1864—). An American educator, born in Hamden, N. Y. He graduated at Cornell in 1887, and studied in Germany. After two years as professor of pedagogy and philosophy in the University of Colorado, he became in 1897 professor of the history of education in the New York Teachers' College, of which he was made president in 1898. On the work of this institution he made a special report to the Education Board of Great Britain (1902). His other publications include *The Extension of University Teaching in England and America* (1895; Ger. trans. 1895) and *The History, Organization, and Methods of Secondary Education in Germany* (1899).

RUSSELL, JOHN (1745-1806). An English portrait painter, born in Guildford, Surrey. He studied under Francis Cotes, and remained with him until 1767. In the meantime he had been converted to Methodism and was such a militant reformer that he is said to have attempted to convert his sitters. He settled in London about 1768, and became a well-known worker in crayon although he occasionally painted in oils. His subjects included Philip Stanhope, son of Lord Chesterfield, Bartolozzi, Cowper, Wilberforce, The Rev. Dr. Todd, and Sheridan. He published *The Elements of Painting with Crayons* (1772-1777).

RUSSELL, Lord JOHN, first Earl Russell (1792-1878). An English statesman, born in Westminster, August 18, 1792. He was the third son of the sixth Duke of Bedford. He was educated at Westminster School and at Edinburgh University. In July, 1813, he was returned to Parliament for the borough of Tavistock, and, according to the family traditions, he entered the ranks of the Whigs. Russell's real political life began in 1820 when he was returned to Parliament from Huntingdonshire. He became an ardent advocate of Parliamentary reform. He also interested himself in the repeal of the Test and Corporation Acts, which he carried in 1828 against the united efforts of Peel, Huskisson, and Palmerston. He cordially supported the Catholic Emancipation Act, which was passed in 1829. In 1830 the question of Parliamentary reform became crucial and caused the resignation of Wellington's Tory Government. Earl Grey followed the Duke as Premier, and took Russell into the Ministry as Paymaster-General of the forces. Lord John at once rose into great prominence through his part in the Reform Bill of 1832, the first reading of which he moved in the Commons. (See PARLIAMENT.) He subsequently took part in the agitation against the Corn Laws. On the resignation of Peel, in December, 1845, Russell was summoned to form a Ministry, but was unable to do so, and Peel resumed office and brought about the repeal of the Corn Laws (q.v.). He was soon forced out on the question of Irish coercion. Again Russell was called upon to form a Ministry, and this time he succeeded (July, 1846).

Russell continued as Premier for nearly six years. The usual Irish discontent had been greatly augmented by the famine, and all Ireland was ripe for rebellion. Russell handled the matter with much skill. Relief measures went hand in hand with coercive measures, and in a few months Ireland was quieter than it had been for years. The most important act in this connection was the Encumbered Estates Act. (See IRISH LAND LAWS.) This administration also saw the end of the Chartist movement. (See CHARTISM.) In 1851, as a result of the Pope's attempt to reëstablish the Catholic hierarchy in England, the Ecclesiastical Titles Assumption Act (q.v.) was passed. In December, 1851, when the Foreign Secretary, Palmerston, without consulting his colleagues, recognized the Government formed by Louis Napoleon after his coup d'état of December 2d, Russell demanded his resignation. Palmerston soon brought about the downfall of the Government. Russell resigned and Lord Derby came in with the extreme Tories. Derby, however, had no majority, and in turn resigned after a brief term in office. A coalition Ministry of Whigs and Peelites was then formed (December, 1852) under Lord Aberdeen, in which Russell appeared as Secretary for Foreign Affairs. The mismanagement exhibited in the operations of the Crimean War, and the great loss of life incurred, brought about a motion in the House of Commons, for an inquiry into the conduct of the war. Russell was ill-prepared to resist this and resigned. He then supported the motion and Aberdeen resigned. Derby and Russell each attempted to form a Ministry, but without success. Palmerston was then called upon and succeeded. Russell was asked to join, but refused. He was then sent as plenipotentiary to the conference at Vienna, which it was hoped would bring about peace. Meanwhile the Peelites had withdrawn from the Ministry and Russell in March, 1855, very reluctantly entered the Ministry, though he still remained at the conference. On his return the opposition in Parliament raised a great outcry in regard to his proceedings at Vienna, and being unable, by reasons of State, to account in full detail for his course, Russell resigned. In 1859 he again appeared as Foreign Secretary under Palmerston. The Italian War of Liberation and the American Civil War were the most difficult questions he had to meet. To the Italians he gave his most ardent support. His conduct in regard to the American War has been defended and criticised, some claiming that he ably preserved British neutrality, others contending that the cases of the *Alabama*, *Florida*, etc., prove the contrary. In 1861 he was created Earl Russell. In 1865, on the death of Palmerston, Russell again became Premier. The new Ministry now brought forward a Parliamentary reform bill. The Liberals, however, did not give hearty support to the bill, and it was defeated. Russell at once resigned and never took office again. His last years were spent chiefly in literary work. He died on May 28, 1878. Consult: Walpole, *Life of Lord John Russell* (London, 1889); Reid, *Lord John Russell* (ib., 1895); Walpole, *History of England* (ib., 1878-86).

RUSSELL, JOHN SCOTT (1808-82). A British naval engineer, born at Parkhead, near Glasgow. He studied at the Universities of Edinburgh, Saint Andrews, and Glasgow, and in 1832 was elected to the chair of natural philosophy at Edinburgh to fill a temporary vacancy. A paper which he read before the British Association on the nature of waves led to the appointment of a committee to make experiments, and these resulted

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in Russell's discovery of the wave of translation and his development of the wave-line system of ship-building. Another paper *On the Laws by Which Water Opposes Resistance to the Motion of Floating Bodies*, which he read before the Royal Society of Edinburgh in 1837, earned him the society's large gold medal. For a number of years he was manager of a ship-building plant at Greenock. In 1844 he removed to London, where he began to build vessels of the largest sizes. His two most famous ventures were the *Great Eastern*, the subsequent failure of which forced him to abandon ship-building, and the armored frigate *Warrior*, the first seagoing vessel of its kind. He was one of the founders of the Institution of Naval Architects, was for some time its vice-president, and contributed frequently to its *Transactions*. He also contributed to the seventh edition of the *Encyclopædia Britannica* (1841), and wrote a number of works on naval architecture.

RUSSELL, Odo William Leopold, first Baron Ampthill (1829-84). An English diplomatist. He was born at Florence, was privately educated, and entered upon a diplomatic career as attaché of the English embassy at Vienna. From 1850 to 1852 he was under Lord Palmerston in the English Foreign Office. He was subsequently in diplomatic service at Paris, Vienna, Constantinople, Washington, and Florence, and from 1860 to 1870 was acting Minister at the Vatican. In 1871 he was appointed Ambassador at Berlin, where he did much to promote cordial relations between England and Germany.

RUSSELL, Sol Smith (1848-1902). An American actor. He was born at Brunswick, Me. He served as a drummer boy in the Union Army, and in 1864 he became connected with a theatre at Cairo, Ill. For several years he devoted himself largely to monologues and musical performances, till he won a recognized place as a 'lyceum' entertainer. He went to New York City in 1871 and in 1874 became a member of Daly's company. He began as a regular star in 1880 with a play called *Edgewood Folks*. In this and in his subsequent productions, such as *Peaceful Valley*, *A Poor Relation*, *A Bachelor's Romance*, and *The Hon. John Grigsby*, the evenness and finish of his acting, his peculiarly quaint and gentle humor, and the truth and delicacy of his pathos won for him real and lasting popularity throughout the country. In 1900 ill health compelled him to retire. Consult: McKay and Wingate, *Famous American Actors of To-Day* (New York, 1896); Strang, *Famous Actors of the Day in America* (Boston, 1900).

RUSSELL, William, Lord (1639-83). An English Whig Parliamentarian. He was the third son of William, fifth Earl Russell, and was educated at Cambridge. From 1660 to 1678 he was member of Parliament for Tavistock; in 1674 he inveighed against the corruption of the Cabal, the influence of France, the dishonorable commencement of the war with Holland, and the fraud practiced upon the bankers, and was afterwards conspicuous wherever the cause of constitutional liberty could be befriended. In 1680, at the head of more than two hundred members of the Commons, he carried to the House of Lords the Bill of Exclusion, directed against the Duke of York's succession to the throne. The King and the Duke determined to be revenged upon Russell and to crush the leaders of the Whig Party. Charged as participators in the Rye House plot (q.v.), Lord Russell and Algernon Sidney were arrested, arraigned for high treason, and by the aid of perjured witnesses and a packed jury were sentenced to death. Charles II. was disposed to show mercy, but the Duke of York insisted upon the prisoners' death. The unconstitutional murder of Russell, followed by that of Sidney, led, in the next reign, to the overthrow of the Stuart régime. Consult Russell, *Life of William, Lord Russell* (London, 1820).

RUSSELL, William Clark (1844—). An English novelist. He was born in New York City of English parentage, was educated in England and in France, and in 1857 shipped as a midshipman on an English merchantman. He followed the sea until 1865, when he settled in London, and turned his attention to writing. In 1874 he brought out his first sea story, *John Holdsworth, Chief Mate*, and from that time on his success was assured, and stories drawn from his experience and knowledge of the seafaring life followed one another in quick succession. His stories are written in a clear picturesque style, display considerable dramatic skill, and are said by seamen to be the most faithful portrayals of life on the sea ever written. Among his published works are: *The Wreck of the Grosvenor* (1875); *The Lady Maud* (1876); *A Sailor's Sweetheart* (1877); *An Ocean Freelance* (1878); *My Shipmate Louise* (1882); *The Ship; Her Story* (1894); *The Convict Ship* (1894); *What Cheer!* (1895); *Rose Ireland* (1896); *The Last Entry* (1897); *The Two Captains* (1897); *The Romance of a Midshipman* (1898); *The Ship's Adventure* (1899); and lives of *Lord Collingwood* (1891) and *Admiral Nelson* (1897).

RUSSELL, William Eustis (1857-96). An American lawyer and Governor, born in Cambridge, Mass. He was educated at Harvard and at the Boston University Law School. In 1880 he became a member of the Boston law firm of Russell & Russell, of which his father and two brothers were already members. In 1885 he was chosen Mayor of his native city, and for two succeeding years was reëlected with no opposition. His effective administration of the city's affairs, particularly in the enforcement of the local-option law, attracted wide attention. At his third nomination for the office of Governor in 1890 he was elected, and was reëlected in 1891 and 1892, in each case his victory being largely a personal one. His administration was marked by impartiality and lack of partisanship. In 1893 he resumed his law practice. Early in 1896 a strong movement became apparent in the Eastern States to nominate him for the Presidency, but his strong and freely expressed views in favor of a gold standard rendered its success impossible. A movement to name him for the Presidency on a Democratic gold-standard platform was checked by his sudden death in his camp in the Nova Scotia woods a week after the Chicago convention of that year.

RUSSELL, Sir William Howard (1820—). A British journalist, born in Ireland. He was educated at Trinity College, Dublin. He wrote for the London *Times* in 1841, and became attached to the Parliamentary corps of that paper in 1843. His first important expedition as a correspondent was in 1854, when he was sent by

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the *Times* to the seat of the Crimean War, in the description of which he established a high reputation for brilliancy of diction and graphic representation. He visited Moscow in 1856, and described in the *Times* the coronation of the Czar. In 1856 he was sent to India on the occasion of the mutiny, and was with Lord Clyde from the capture of Lucknow until the close of the mutiny. In 1858 he returned to England, and established the *Army and Navy Gazette* (1860), which he continued to edit. In 1861 he was sent by the *Times* as war correspondent to the United States, but returned after the first battle of Bull Run, when he rendered himself obnoxious to the Union leaders. In 1866 he was present at the battle of Königgrätz or Sadowa; in 1870 at the battles of Sedan and the siege and fall of Paris; in 1879-80, in South Africa; and in 1883-84, in Egypt. He published: *Letters from the Crimea; Diary in India; My Diary North and South; The Prince of Wales's Tour*, etc. He was knighted in 1895.

RUSSELLVILLE. The county-seat of Logan County, Ky., 30 miles southwest of Bowling Green, on the Louisville and Nashville Railroad (Map: Kentucky, E 4). It is the seat of Bethel College (Baptist), opened in 1854, and of the Logan Female College (Methodist Episcopal, South), opened in 1856. The city manufactures flour and leather. Five miles northeast of Russellville is an extensive asphalt mine. Population, in 1890, 2253; in 1900, 2591.

RUSSEL'S VIPER. See VIPER.

RUSSIA, rŭsh'ȧ. An empire embracing one-sixth of the land surface of the earth. With an area of about 8,650,000 square miles, it is nearly three times as large as the United States, exclusive of Alaska. It includes more than one-half of Europe and the whole of Northern Asia, and has the largest continuous area of any realm in the world. It roughly presents the form of a rectangle whose length is twice its width. Its vast coast line is washed by the Arctic Ocean on the north and the Pacific Ocean on the east. The southern frontier, dividing it from the Chinese Empire, Afghanistan, Persia, and various native States under the protection either of Russia or Great Britain, is mainly marked by great natural features, such as the Amur River, and the mountain ramparts of Sayan, Tian-Shan, and Alai-tagh, which overlook the widespread grassy steppes or sandy wastes of Central Asia. In Western Asia, however, the plains of Siberia merge with the steppes of Russian Turkestan, where nature interposed no obstacles to the easy conquests of Russia, which has here pushed its frontier farthest south in Asia. In the northwest and southwest the empire touches the Baltic and Black seas, but elsewhere in the west it merges with the States of Western Europe—Rumania and Austria-Hungary in the south, Prussia in the centre, and Sweden and Norway in the extreme north. The Imperial territory was extended in 1899 by the formation of the Province of Kwang-tung, leased from China and including Port Arthur, Ta-lien-wan, and the adjacent seas and territory to the north. This new possession is already connected with Saint Petersburg by a branch of the Trans-Siberian Railroad.

The empire may be divided into five parts: (1) Russia in Europe (with Poland and the Grand Duchy of Finland); (2) the Caucasus (Northern Caucasia, or Ciscaucasia, and Transcaucasia); (3) Siberia; (4) Russian Central Asia; (5) Kwang-tung. The heart of this enormous State is Russia in Europe, or Russia proper. This article will deal especially with Russia in Europe, and with the Asiatic domain of the empire only in its relation to the empire as a whole. For a treatment of the political divisions of Asiatic Russia the reader is referred to the appropriate headings. The mainland of Russia in Europe lies between 44° 30′ and 70° N. latitude and between 17° 30′ and 65° 30′ E. longitude. Its area is 2,095,610 square miles, or a little more than two-thirds that of the United States exclusive of Alaska. It is separated from Northwestern Siberia by the Northern Ural Mountains, south of which the boundary is artificially fixed to the east and south of the Urals to include within the domain of Russia proper all of the mountain mining districts. The valley of the Manytch between the Caspian and the Sea of Azov divides it from Caucasia and is generally accepted as the southern limit of Europe in that quarter. The Black Sea, the Sea of Azov, and the northern edge of the Danube delta complete its southern boundary, and its western and northern limits are those of the empire as given above. The largest islands belonging to European Russia are the two called collectively Novaya Zemlya (Nova Zembla), in the Arctic Ocean.

TOPOGRAPHY. In its surface features Russia is in striking contrast with the smaller part of Europe west of it. Though it has about 5000 miles of coast line, it has few of the large gulfs, inlets, and peninsulas that broke Western Europe into detached masses and destined it to develop great, independent nationalities. The coasts of Russia leave it a compact mass, irregularly quadrilateral in form; and the geographic unity of this great land mass is completed by the fact that it wholly lacks the great diversity of plains, plateaus, highlands, deep valleys, and declivities which give endless variety to the surface features of Western Europe. As a whole Russia is a great plain stretching away in endless monotony from its western confines and the ice ocean on the north; and the plain is not limited by the European domain of the empire, but extends beyond the Urals to Bering Sea in the extreme northeast and across the Turkestan steppes to Persia and Afghanistan in the south. Thus the plains of the empire are far more extensive in Asia than in Europe. It was this plain that gave unrivaled opportunity for and direction to the vast territorial expansion of Russia. The empire may be crossed to every ocean that touches it without leaving these vast low tracts where the horizon drops around the traveler as on a voyager at sea. The plain of European Russia in its general level is from 300 to 600 feet above the sea. A few areas, conspicuous only because of the monotonous uniformity of most of the country, rise to a height of over 1000 feet.

The higher altitudes of the interior of Russia are chiefly disposed in two masses, extending north and south. They have been designated under the names of the Heights of Central Russia and the Heights of the Volga. The Heights of Central Russia culminate in the plateau of Valdai (1150 feet high). (See VALDAI HILLS.) It very clearly separates the low plains that border the Baltic from the low plains of the

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Upper Volga. Widely separated from this area of elevation by the Valley of the Donetz are the so-called Mountains of the Donetz, extending east and west, rising to 1225 feet and extending this ensemble of elevations almost to the Sea of Azov. The Heights of the Volga have a direction roughly parallel to those of Central Russia. They extend on the right bank of the river from Nizhni-Novgorod and Kazan to Tsaritsin, a distance north and south of 730 miles, attaining 1121 feet near Samara and 1314 feet to the west of Saratov. The greatest width of this area of elevation is about 230 miles. Farther east, on the edge of Asia, the Ural Mountains (q.v.) break the monotony of the plains. They are broken by deep gaps dividing them into three main sections known as the Northern, Central, or Permian (from the Province of Perm), and Southern Urals. The Urals extend from north to south approximately along the meridian of 60° E. for 1500 miles, rising in the north and south to upward of 5000 feet, with gentle slopes on their European face and more abrupt descents on the Asiatic side. The Central Urals, where the rainfall is much heavier than in its other sections, have on this account been more deeply denuded, are low in elevation, and the detritus has been scattered far over the plain on both sides of the range to a depth of 500 feet. The traveler approaching from the west observes nothing suggestive of mountains till he passes the water divide and looks down upon the plains of Siberia. With the exception of the south coast of the Crimea, where the Yaila Mountains and their spurs descend steeply to the sea, there are no other prominent elevations in Russia proper. The most unique feature of the topography of Russia is the area of depression below the sea level in the southeast part of the country along the coasts of the Caspian, a region of sunken plains that is larger than all other depressions below sea level in the world. While the dominant character of the plain of Russia is monotony, and this feature is maintained throughout the empire over wide expanses of flat and low lands, the new parts of the empire have manifold topographic aspects, so that the Russian domain as a whole has many varieties of land and scenery, from the tundras, plains, and low plateaus of Russia in Europe to the steppes both high and low in Asia, and the lofty and wild mountain chains of Caucasia, and the many parallel belts of mountains, gridironed with transverse ranges and spurs, which fill Eastern Siberia and terminate in Kamchatka.

Hydrography. The river system of the great plain of Russia serves most to distinguish it from all other plains. The vast extent of these lowlands favored the development of the largest river systems of Europe (the Danube alone excepted), and all these rivers have reached the advanced stage of mature adjustment to the land, have drained their ancient lakes, established their individuality, and deepened their channels in many cases sufficiently to extend navigation for light-draught vessels almost to their sources. It is the streams flowing from the low plateau known as the Heights of Central Russia which give birth to most of the more important rivers of the country. The chief rivers may be classified according to their respective basins:

Basin of the Caspian Sea. The Volga (q.v.), the largest river in Europe, is continuously navigable for 1800 miles. Two of the Volga's tributaries are especially prominent in commerce. The Oka (q.v.), entering the river from the south at Nizhni-Novgorod, waters the most fertile part of South Central Russia. The Kama (q.v.) drains the western slope of the Central Urals and its basin embraces an area larger than that of Great Britain. The Ural (q.v.) is shallow and chiefly noted for its prolific fisheries and its enormous fleets of small fishing boats.

Basin of the Sea of Azov. The Sea of Azov receives the Don, the third longest river of European Russia. This stream is greatly impaired for navigation by the irregularity of its flow. It is one of the great highways to the sea of the wheat of the eastern black soil region. Its chief tributary is the Donetz, navigable only in its lower course.

Basin of the Black Sea. The basin of the Dnieper, Russia's second longest river, is as large as France. Among its several important tributaries the Pripet is the most noteworthy. The Bug and the Dniester are the only navigable rivers west of the Dnieper.

Basin of the Baltic. The Vistula (q.v.) is Polish throughout its course in the domain of Russia, the great highway being used by the Poles to ship their cereals, timber, and other export products to the Prussian port of Danzig. Its principal tributary is the Northern Bug, which receives the Narev. The Düna or Western Dvina is another large river entering the Baltic. It is navigable almost from the Heights of Central Russia, where it rises, to the Gulf of Riga, into which it empties, but navigation is rendered difficult by rapids in one part of its course. Still another affluent of the Baltic is the Niemen, which takes the name of Memel on entering Prussia. The Narova carries the waters of Lake Peipus through a series of rapids to the Gulf of Finland, the great eastern arm of the Baltic; and the Neva, the outlet of Lake Ladoga, likewise emptying into the Gulf of Finland, though only 43 miles long, discharges more water into the sea than any river of Europe outside of Russia, excepting the Danube.

Basin of the Arctic. The most important rivers tributary to the Arctic Ocean are the Petchora, rising among the Northern Urals; the Northern Dvina, a mighty stream; the Dvina, emptying into the White Sea at Archangel; and the Onega, which drains Lake Bielo-Ozero to the White Sea.

Russia is extraordinarily rich in lakes. Finland and the northwestern provinces of Olonetz, Novgorod, Saint Petersburg, and Pskov contain thousands of them. The largest of these lakes is Ladoga, with an area of more than 7000 square miles (about equal to that of Lake Ontario), Onega, about half as large, and Peipus. Most of the lakes throughout the whole region near the Baltic, where they are clustered, are connected with one another; and between them and the Arctic Ocean great expanses of moorland and swamp cover the low flat country. The lakes are a large element in the interior navigation. In the middle and south of European Russia there are few lakes excepting the small bodies of salt water on the sterile steppes of the southeast.

Climate and Soil. As Russia has a distinctly continental climate, the winters are colder and the summers hotter than in Western Europe in

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RUSSIA
IN EUROPE
Scale of Statute Miles.
0 50 100 150 200 250
Railroads:
Capitals of Provinces:
ARCTIC OCEAN
NORWAY
SWEDEN
BALTIC SEA
Gulf of Bothnia
G. of Finland
White Sea
(Bieloe More)
KOLA PENINSULA
LAPLAND
ARCHANGEL
VOLOGDA
OLONETZ
NOVGOROD
ST. PETERSBURG
ESTHONIA
LIVONIA
COURLAND
KOVNO
VITEBSK
PSKOV
TVER
YAROSLAV
KOSTROMA
VIATKA
PERM
KAZAN
NIZHNI NOVGOROD
VLADIMIR
MOSCOW
SMOLENSK
ULEÅBORG
St. Petersburg
Archangel
Vologda
Kostroma
Kazan
Ekaterinburg
Ural Mts.
Timan Range
Arctic Circle
Kolguev I.
Kanin Pen.
Tcheshskaia Bay
Bolshesemelskaia Tundra
Pai-khoi Mts.
Vaigatch I.
Yugor Str.
L. Ladoga
L. Onega
Valdai Hills
Mt. Denezhkin
Stockholm
Gotland
Åland Is.
Vardö
Varanger Fd.
Ribatchii Pen.
Murman Coast
Onega
Kem
Kola
Tikhvin
Olonets
Petrozavodsk
Viborg
Helsingfors
Abo
Uleåborg
Tornea
Pskov
Novgorod
Tver
Rostov
Yaroslav
Kineshma
Totma
Ust Sisolsk
Solvitchegodsk
Veliki Ustug
Kotelnitch
Viatka
Glazov
Sarapul
Kungur
Perm
Solikamsk
Tcherdin
Irbit
Kamishlov
Shadrinsk
Troitsk
Tobol
Tura
Pechora
Mezen
Pinega
Vashka
Vitchegda
Dvina
Dniester

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the same latitudes. The mean annual temperature, corrected for altitude, is a little lower as one goes from west to east; and this tendency holds to the Pacific coast of Asia. There is naturally a great diversity of temperature as one proceeds from north to south, since Russia reaches into the Arctic Zone and extends as far south as the latitude of Lombardy. Frozen swamps skirt the north coasts and the vine and the olive thrive in the Crimea. All of the extreme north has severely cold weather or hard frosts from 6 to 8 months in the year. The mean temperature of January at Saint Petersburg is about 15° F. and of July about 64°. Moscow, although much farther south than Saint Petersburg, has a still more rigorous winter climate, owing to its inland location. The mean temperature of Odessa in summer and in winter is about the same as that of Boston. On the whole the climate is very uniform considering the size of the country. As the Russian plain is low, atmospheric disturbances are easily propagated over the entire surface. No mountain ranges obstruct the cold north wind that sweeps from the Arctic Ocean to the Black Sea. The warm southern breezes are felt along the slopes of the Urals to the mouth of the Petchora and to Archangel. In the greater part of Russia proper the winters are long and severe and the summers are hot and sultry. In the Baltic Provinces the winters are less severe than in the interior. The rainfall of European Russia is less than that of Western Europe; but though the average precipitation is not over 20 inches a year, it is usually sufficient to insure good crops. The rainfall decreases from northwest to southeast, being smallest around the northern shores of the Caspian Sea. At Saint Petersburg the annual precipitation is 18 inches, at Kazan 14, and at Astrakhan 4.8 inches. Nearly the whole of Russia is covered for months in winter with a thick mantle of snow, which contributes greatly to the fertility of the soil when the spring thaw sets in. Snow covers the ground at Odessa for 80 days and at Moscow 120 days. The rivers throughout the empire freeze in winter. The coldest winds of the country are the moist north and the dry east winds.

The mixed clays and sands spread over the surface of nearly the entire northern half of the country in the glacial epoch form soils of fair average fertility, on which grow vast expanses of forests and large areas of flax, hemp, and cereals. The region of unsurpassed fertility, however, is the black earth lands between the glacier-swept area and the steppes of the extreme south, covered with deep, rich humus, now considerably impoverished, owing to many years of over-cropping without fertilizers. The only unfertile region in the warmer areas is the salt steppes of the southeast, whose unproductivity is due more to the lack of rain than to the failure of plant-food in the soil.

Flora. The five areas into which the vegetation of European Russia may be divided correspond roughly to so many climatic zones. In the north, between the Arctic Circle and the ice ocean, is a treeless land (tundra), covered with vast marshy moors, interrupted by boulder-strewn plains, solidly frozen much of the year, and producing nothing but reindeer and other mosses, lichens, and stunted shrubs. South of the tundra is the forest region, the third largest in the temperate zones, covering more than a third of Russia, and embracing the north and a part of the central regions. The low forests forming the northern belt of the forest zone consist of birch, larch, silver fir, and some other hardy trees. They are succeeded by the high forests of splendid arboreal vegetation, mostly conifers, pine and fir, yielding great supplies of soft lumber and resin, turpentine, and tar. The conifers are succeeded by the great deciduous forests of Central Russia (oak, maple, ash, and other trees), which form the southern belt of the forest zone. Agriculture has pushed northward into this zone, and large areas of the flax, hemp, and rye fields occupy cleared lands. South of the forest zone and roughly bounded on the north by the Volga is Russia's greatest source of wealth —the black earth region (*Tchernoziom*), the granary of Russia, with boundless fields of wheat and other cereals, and with an abundance of grasses, but with an absence of trees. This broad zone extends into Rumania on the west and passes around the Southern Urals into Siberia on the east. Still farther to the south, skirting the Black and Caspian seas, lie the steppes. The River Don, traversing the steppes, divides them into two parts of very different character. The western and well-watered half is a populous pastoral district, rich in nutritious grasses, on which many millions of cattle, horses, and sheep are fed and fattened; the eastern half, arid and inhabited only by wandering tribes of Kalmucks and Cossacks, is occupied by bleak plains, salt marshes and lakes, and sandy deserts. Bessarabia and the Crimea form a southern zone beyond the steppes, where maize thrives, the wines of Russia are produced, and the olive ripens.

Fauna. The Arctic fox and polar bear, reindeer, and seals are found along the northern coasts or on the lands north of the Arctic Circle. The forests formerly made Russia the great source of the fur and skin trade of Eurasia, but this commerce has been largely reduced by the over-destruction of fur animals, and Russia has for years given way to Siberia as the chief source of the empire's fur trade. The fox, hare, brown and other bears, wolf, lynx, elk and other deer, wild boar, and glutton still abound in the forests. The beaver is now found only in the Government of Minsk. Most of the carnivora of the forest belt and also squirrels, foxes, and hares are found in the black earth region, but the most distinctive animals of this agricultural area are the suslik and the baibak, which are the pests of the grain fields. Birds, most numerous in the forests, include the grouse, hazel hen, and partridge. The northwestern coast waters, warmed by the Atlantic drift, abound with cod, salmon, and other highly prized fish, and not only the coast but also the river fisheries are highly important. The most remarkable fishing grounds are situated near the mouths of the Don, Volga, and Ural, where herring, sheat-fish (10 to 12 feet long; weight over 600 pounds), and sturgeon are caught in incredible numbers. About one-half of the enormous value of the Russian fisheries is yielded by the Caspian Sea.

Geology and Mineral Resources. Russia proper is a geological world apart from the rest of Europe. The endless variety of structure that is seen in Western Europe gives place in Russia to almost horizontal layers, rising and falling only

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here and there in gentle undulations and covering hundreds of thousands of square miles, with nearly the same outward aspect and the same interior structure. The great zones of Paleozoic and Carboniferous rocks that cover Russia stretch away east and south to the very heart of Central Asia. Along the base of the Urals, between the Arctic and the steppes of the Caspian, extend the new red sandstones, the Permian formations deriving their name from the Government of Perm, which are generally regarded as marking the close of the Paleozoic era. There are also some rocks of more recent ages. Jurassic strata skirt the Permian southward and overlap them in the centre, forming a rough triangle which tapers from the Arctic to the Volga; and farther south, chalk, Tertiary and more recent rocks skirt a granitic tableland that obliquely crosses the steppes in the extreme south; granites are also predominant in Finland. In the southwest of Poland the highlands contrast forcibly with the great plain in the variety of their formations, which include chalks and Jurassic, Triassic, Carboniferous, and Devonian rocks, many minerals being mined in this hilly region. The Urals form geologically one system throughout of crystalline rocks. The gold of the Middle Urals is not sought in the granitic and serpentine rocks, but in the detritus that covers a large area at the base of the mountains. The mountains that cross the south side of the Crimea are of limestone and are mere fragments of the former ranges.

The whole of North Russia, with the exception of that portion of the plain along the Urals, was buried during the glacial period under the ice masses which invaded it from the Scandinavian peninsula, covering the land with morasses and erratic boulders, and leaving thousands of glacial lakes among the evidences of the various advances and retreats of the ice sheet. No region of Europe is more thickly sprinkled with erratic boulders, many of enormous size, than Finland. In the southern part of Russia, on the other hand, no erratic boulders are found to the south of Tula, Ryazan, and Kazan. All traces of the ancient glaciers disappear where the black earth lands begin. The great region of salt lakes, marshes, and steppes which forms the southeastern steppe region of Russia is a remnant of the old Caspian basin.

In its mineral wealth Russia is one of the most richly endowed countries of Europe. Gold, silver, platinum, iron, copper, zinc, salt, and coal are the principal minerals worked. Defective means of communication and dearth of fuel have hitherto prevented the mining industry from attaining full development. The only regions where coal and iron in juxtaposition are largely mined are in the Donetz coal basin and Poland. Between 1887 and 1897 Russia tripled its production of iron and steel. Iron ore is found in Perm and Vyatka (Urals), in a mining region around Moscow (Central Russia), in the Donetz basin (South Russia), Poland, Finland, and to a small extent in some other regions. Magnetic ironstone, the most valuable iron ore, is mined along a large part of the Urals.

The production of pig iron has ranged since 1898 from 2,200,000 tons to 2,850,000 tons a year. South Russia has supplied about one-half, the Urals about one-fourth, and Poland one-ninth. The production of steel in 1899 was 1,318,000 tons, the rolled iron product being only about one-third as large as the steel output. Russia supplies about four-fifths of all the coal and pig iron consumed in the country and nearly all of the steel. Coal exists in much greater quantities than was formerly supposed. The best coal (partly anthracite) is obtained in South Russia near the Donetz River, and these mines and those of Poland yield two-thirds of the output. The mines of Poland are a continuation of the Silesian coal measures. The central coal field south of Moscow is also important. It is somewhat difficult to work the Russian coal deposits, and, though the total annual yield has steadily increased (298,500 tons in 1860, 695,400 in 1870, 3,280,000 in 1880, 6,022,000 in 1890, and over 12,000,000 tons in 1899), the supply falls short of the quantity required. The imports, chiefly from England, are large in spite of the tariff. The chief sources of gold are Siberia (28,276 kilograms in 1899) and the Ural Mountains (10,465 kilograms), about one-fourth of the product being obtained from auriferous veins.

Copper (8000 tons in 1901) comes chiefly from the Urals and Caucasus and to a lesser extent from Poland and Finland. About 90 per cent. of the world's supply of platinum comes from the west side of the Urals (6223 kilograms in 1901). Zinc (6000 tons in 1901) is a product of Poland. Mercury (357 tons in 1899) comes from Ekaterinoslav in South Russia and Caucasia. Salt is found in Russia in inexhaustible abundance. The rich beds of rock salt in the Donetz basin yielded 789,800 tons in 1899; 333,600 tons came from Astrakhan, and 315,500 from Perm. The total product in 1899 was 1,643,000 tons. The lakes of the southeastern steppes yield abundant salt and some of them are filled with a saturated solution of salt. Many lakes also yield soda. Iridium (solid), malachite (in large blocks), lapis lazuli, emeralds, diamonds, topazes, and onyxes are found in the Urals, and amber on the Baltic coasts. Russia is deficient in building stone, but colossal blocks of granite occur in Finland. Porcelain clay and meerschaum are found in the Crimea. Marble is quarried in Finland and the Crimea. There are numerous chalybeate, sulphur, and saline springs. Peat moors on the Baltic coast and near Moscow are a source of fuel. The Baku petroleum fields in Transcaucasia are one of the greatest sources of mineral oil in the world. The total production of crude oil in 1901 was 85,168,556 barrels. A pipe line with pumping stations over the mountains from Baku to Batum to facilitate transportation by Black Sea routes was nearing completion in 1903. Two-thirds of Russia's contribution to the world's gold output comes from Siberia.

The world receives its chief supply of manganese from the Caucasian mines in the Government of Koutais, where there is a vast bedded deposit nearly seven feet thick, lying practically level. The production in 1899 was 416,340 long tons.

AGRICULTURE. Russia is preëminently an agricultural State. It pays for its imports with farm produce, and four-fifths of the population subsist by husbandry. One-fifth of the surface, however —the tundras in the north and the salt steppes in the southeast—is entirely incapable of cultivation. There are also about 15,000,000 acres of unproductive swamp lands in West Russia, but

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drainage works are gradually reclaiming them. About 38 per cent. of the cultivable area is occupied by forests, and about 16 per cent. by pastures and meadows. About 900,000,000 acres are cultivable, of which 225,000,000 consist of the celebrated black earth, which is naturally the richest wheat land in the world. Owing to the small density of the population, however, only about 215,000,000 acres are usually under crops.

Some of the evils to which farming in Russia is subject are only partly remediable. The long winters and short, hot summers force grain rapidly to maturity and compress into a few weeks an amount of work to which the farmers of Western Europe can give as many months. Thus more men and horses are needed in a few critical weeks than can be utilized at other periods of the year. The scanty rainfall also is in some years more meagre than in others, and periods of drought and severe famine ensue, the evil being intensified by the fact that most of the peasants are poor and do not carry reserve supplies of food over from one year to another. The Government in 1899 adopted new regulations for the more thorough distribution of relief supplies in these periods of distress. Farming is still generally conducted by very primitive methods. English farmers raise from two to four times as much grain to the acre as Russian farmers. The tenant system on the enormous estates of the great landowners results in wasteful and careless methods of tillage. There are no well-cultivated detached small farms, most of the peasantry living in communes (mirs) going out to till lands that are not theirs, but are owned by the community, though the product belongs to the individual cultivator. (See MIR.) Landownership among the peasantry is, however, rapidly increasing. Agricultural development is also hindered, of course, by the ignorance of the lower classes, a difficulty which the Government is trying to remedy by the opening of schools of husbandry and model farms. Agricultural machinery is scarcely employed excepting on the large estates. In spite of these drawbacks, however, European Russia produces about two-thirds of the oats and half the rye of Europe, and more barley than any other European State; is surpassed only by the United States in its wheat crop; and raises more flax and hemp than any other country in the world. These cereal and fibre crops, together with potatoes, beet root, and tobacco, are the great agricultural products of Russia.

The chief place is taken by cereals. Rye (representing over one-third of the ground sown) is the best crop. It is the leading breadstuff for home consumption and the quantity raised is more than double that of wheat. But wheat is the most important export crop, being grown chiefly in the black earth region of South Russia. In good seasons Russia exports about 100,000,000 bushels, being second only to the United States as a seller of this cereal, and supplying three-fourths of the export wheat of Europe. The yield is on an average only about 9 bushels to the acre, or only about two-thirds of that in the United States. Oats, barley, and rye are raised chiefly north of the great wheat area, and maize is grown in the southwest. Until 1877 Russia surpassed the United States in the production of cereals. The average annual output of cereals for five years from 1896 to 1900, inclusive, for the empire (including Poland, the Caucasus, Siberia, and Central Asia) was (in bushels): Wheat, 419,000,000; rye, 802,000,000; oats, 800,000,000; barley, 252,400,000.

Rice is an increasing crop in the Caucasus, Siberia (Transbaikalia), and Turkestan, and is now largely used by the peasants throughout the empire. The crop of Transcaucasia alone amounts to about 50,000 tons a year and is shipped all over Russia through the Volga and Black Sea ports. The beet industry is one of the most important branches of agriculture and manufacture in Russia. Domestic beet sugar supplies the entire demand of the empire, and furnishes enormous quantities for export, Russia being the chief source of sugar for all the Black Sea territory and Persia. The excess over the home demand is forced out of the country and sold abroad at a price below that prevailing at home. More than 1,000,000 acres, mainly in the black earth region and South Poland, are given to sugar-beet culture.

In 1899 4,004,642 acres in European Russia, including Poland, were in flax and yielded 357,369 tons of fibre and 17,304,357 bushels of linseed. Russia supplies nearly four-fifths of the flax tow consumed by all countries. The product is not of superior quality, but its export is a source of great wealth. It is grown in Poland, the Baltic Provinces and the region of the Upper Volga for tow and in the more fertile black-earth lands for linseed. Hemp is grown in the same districts and also in the central governments of Orel, Tula, Kaluga, and others. In 1899 the crop yielded 217,380 tons of fibre and 19,675,262 bushels of hempseed from 1,813,034 acres. Next to grain, flax and hemp form the principal exports of Russia. The cotton-raising districts of the empire are in Russian Turkestan and Transcaucasia, the largest supply, averaging about 800,000,000 pounds annually, coming from Ferghana, most of it raised from seed of American upland. The cultivation of potatoes has doubled in the past quarter of a century and the tubers are largely used in the manufacture of spirits. Russia ranks after Germany and Austria-Hungary in tobacco culture, producing about 100,000,000 pounds a year in Bessarabia, Little Russia, and South Russia, much of it of superior quality. Transcaucasia adds to the supply. Viticulture has made much progress in the southwest and south (Bessarabia, Kherson, Podolia, and the Crimea). Bessarabia has about 200,000 acres of vineyards. The best red wines now compare favorably with good French wines and are cheaper, and the champagnes of Odessa compete successfully in Russia with the French vintage. Fruit is grown in the south.

FORESTS. Wood is used in Russia on a most wasteful and extravagant scale both for industrial purposes and as fuel. Though the wealth of European Russia in timber alone is surpassed only by the forests of Canada and the United States, and the forests of the empire probably surpass those of any other country in extent, the science of forestry is almost non-existent. In parts of the north the superabundant woods are utilized only to produce potash, resin, tar, and turpentine, while the south suffers for want of timber. Russia exports timber to the value of from $30,000,000 to $50,000,000 a year. The forests in Russia proper cover an area of about 475,000,000

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acres; in Finland, 50,000,000; and in Poland, 6,700,000.

STOCK-RAISING. In its live-stock interests Russia naturally surpasses any other country of Europe. Nearly half the horses of the Continent are raised in Russia; it leads all the other countries in cattle, sheep, and goats, and is inferior only to Germany in the number of hogs. In proportion to the population, however, Russia's wealth in live stock is not remarkable. The industry is largest on the broad southwestern steppe, where the animals spend the whole year in the open air. Farther north, however, animals must be fed under cover for 100 to 200 days in the year, and this is a great region of hay-making. The breeding of domestic animals is not skillfully conducted except as to horses, the 3000 stud farms by which the Government is promoting this industry having been so successful that Russia now has not only the most, but also the best horses in Europe. Meat, tallow, and hides are the main objects of cattle-raising, dairy interests being neglected. Next to Great Britain, Russia yields the largest quantity of wool in Europe, all of which is utilized in the Russian wool factories, most of it being sold in the great wool markets of Warsaw, Kharkov, Nizhni-Novgorod, and Rostov. Bristles are the chief article of hog products exported. Camels are bred in the southeast, and reindeer form the wealth of the Laplanders and the inhabitants of Northeast Siberia. The number of domestic animals in the empire in 1900 was: Horses, 25,961,700; cattle, 43,586,900; sheep and goats, 70,647,300; hogs, 13,924,500. Perhaps in no other country are fish so important in domestic economy as in Russia. On account of the numerous fast-days, fish are indispensable to the whole nation; and though the value of the home fisheries is in some years as high as $50,000,000, large imports are necessary, and isinglass and caviare are the only fishery produce exported.

MANUFACTURES. The Government protects home industries by imposing a very high tariff on imports, averaging about 35 per cent. of their value. Until about 1820 Russia was almost completely dependent upon other nations for manufactured goods. Manufactures have wonderfully developed under the protective tariff, but the hardships of excessive protection have forced the Government recently to abolish some of the import duties, notably those on iron and steel. Industries have been greatly promoted by the variety of raw material which the empire affords, as well as by the abundance of capital (much of it from foreign countries, attracted into the empire by high protection) and the large dividends which enterprises in Russia have yielded. Trained talent and highly skilled labor from foreign countries are largely employed. The superintendents, chemists, engineers, and mechanics in the factories are generally foreigners.

The industrial system differs much from those of more western countries. The larger part of the Russian factories are very small and are situated in the country, not, as in the United States and England, in the towns. The majority of the work people are engaged in agriculture in summer, but devote the long winters to various manufactures, either in their own homes, or in towns, whither they repair for employment. Moscow, Saint Petersburg, Warsaw, Lodz, and Bialystok have a permanent manufacturing population. Many other cities attract to their factories in winter thousands of work people from the farms; and a large part of the factory hands in all the larger centres are those who have abandoned agriculture for manufacturing pursuits. The manufacture of linen, woolen goods, leather, house utensils, earthenware, hats, and many other articles is still very largely in the hands of peasant work people (Kustari), who produce their wares in their own homes or village shops. Their work is highly skilled, for the division of labor is often carried to a very great length. There are more than 100,000 of these small factories and home workshops, most of which were not included in the enumeration of manufactories (including mining industries) in Russia proper in 1897, when the number of establishments was given as 39,029, employing 2,098,262 work people, and with a total product valued at $1,462,159,160. The chief branches of industry, with the number of people employed and value of production, were, in 1897:

	People employed	Production
Articles of food	255,357	$333,779,740
Textiles	642,520	487,342,440
Leather	64,418	68,009,870
Wool	86,273	52,991,955
Chemicals	35,320	30,670,825
Paper and cardboard	46,190	23,427,350
Metals	758,644	362,753,125
Ceramics	143,291	42,533,850
Other	66,249	60,650,005
Total	2,098,262	$1,462,159,160

In 1898 the capital invested in the leading financial, manufacturing, industrial, steamship, and other Russian enterprises, numbering 1181, was estimated at $894,480,840, nearly 20 per cent. of which was supplied by foreign companies. Moscow is the greatest industrial centre.

The output of the textile industries is of greater value than that of any branch of manufactures. Only imported cotton goods were worn before 1840, but there are now nearly 5,000,000 cotton spindles, and Russia is surpassed in amount of cotton spinning only by Great Britain and the United States. The product of the cotton industry was valued in 1897 at 430,218,000 rubles, or about half the value of the entire textile output. The product not only meets almost the entire domestic demand, but there is also a surplus for export to Asia and Rumania. Russian cotton goods cannot compete in the markets of Central and Western Europe; neither is there any market in Russia for any Western cotton products excepting the finer fabrics which are not yet produced at home. The chief cotton-manufacturing centres are the Moscow district, with large dyeing and printing works, Vladimir, Ivanovna, Tver, Shuya, Saint Petersburg, Warsaw, and Lodz, which last produces seven-eighths of all the cotton cloth made in Poland and one-tenth of the cotton yarn spun in Russia. The woolen industry also has greatly expanded, especially in the manufacture of cloth, the Moscow district leading. The carpets of Vassilievka, near Moscow, are noteworthy. The value of the flax and hempen goods, produced chiefly in the households and in the factories of the central governments, averages about $125,000,000 a year. The silk industry, centred almost wholly in the Moscow district, consumes

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over $6,000,000 of raw silk and yarn a year, purchased in Italy, China, and Persia. Efforts are being made to extend silk-culture in Transcaucasia and Turkestan in order to reduce the foreign imports. The distillation of spirits ranks next to textiles in value of output, the consumption of spirits being nearly two gallons per capita a year. In 1899 there were 1769 distilleries in European Russia, producing 171,291,204 gallons by distillation, and the brewing business is also large. Esthonia, south of the Gulf of Finland, is the largest centre of production. The Government, with a view to restricting intemperance among the peasantry, now controls the production and sale of spirituous beverages (not including wine and beer) throughout European Russia.

The native metal industry is of great importance, though it has suffered greatly from defective communications and lack of fuel. The manufactories of machinery are located in the central and particularly the southern industrial region. Many factories supply agricultural machines and implements, the value of the output having risen from $1,112,500 in 1867 to nearly $5,000,000 in 1897. This business is yet in its infancy and Russia is still dependent upon other nations for its best metal goods in all lines, machinery coming from the United States, England, and Germany. Still the metal industries employ a vast number of workmen (646,000 in the mining and working of metals in 1899). The railroads are supplied with home-made rails. Iron and steel goods of many kinds are produced. Moscow and Saint Petersburg manufacture gold and silver articles, watches, and musical and astronomical instruments. The output of refined sugar from 277 sugar works was 880,497 tons in 1901, most of the mills and refineries being in Poland (chiefly near Warsaw) and Little Russia (especially in the Government of Kiev). The tobacco factories (Saint Petersburg, Moscow, Kherson, Finland) manufactured 85,220 tons of tobacco, cigars, and cigarettes in 1898, cigarettes being an article of export. Russian leather manufactures, long famous, are carried on in all parts of the empire. The well-known Russia leather is made chiefly in the centre and north, Turkey leather in the east and south. Ships are built at all the seaports and on the Volga, Oka, and Kama. Chemical factories are found all over the empire, but chiefly in the Government of Moscow (saltpetre, potash, and albuminous substances). There are nearly 4000 flour mills. Saint Petersburg's manufactures of malachite are famous, and the glass and porcelain made in the Imperial factory at the capital are of a very high class. The production of these articles and also of paper, furniture, and fancy goods falls below the domestic demand.

COMMERCE. It is not easy in countries like Russia, where the means of communication are poor, for merchants to inspect all the varieties of goods they may wish to sell unless great collections of goods are brought together at fixed times and at central places. This is the reason why large fairs are still held in Russia. The seven principal fairs are at Moscow, Kharkov, Poltava (where horses, sheep, and wool are dealt in on a large scale), Yelizavetgrad, Kursk, Irbit, and Nizhni-Novgorod. Since 1817 the fair at Nizhni-Novgorod, at the junction of the Volga and Oka, has been the largest in the empire, and it is without a rival in any country for the great quantity and variety of goods offered for sale. Here Europe and Asia exchange their goods. Wares and raw materials from China and as far west as Paris are displayed and the annual sales amount to about $85,000,000. Though railroads and the employment of commercial travelers and other conveniences of modern trade are making rapid headway, little change in the volume of business at the great fair is observed. The fair at Irbit, in the Government of Perm, is the great market for Siberian goods.

The trade relations of Russia with the countries west and east of it are very different. Russia is to Turkestan and all Asiatic countries a manufacturing State, sending to them the product of its mills and shops, and buying their cotton and other raw materials; but to the Western nations Russia is an agricultural State, sending them its grain, flax, and hemp, and buying their manufactures. Thus Russia forms an important connecting link between two quarters of the globe, though the great bulk of its trade is with Europe. The volume of foreign trade is small considering the vast resources of European Russia and its enormous population. Though it is more populous than the United States, its general merchandise trade with foreign countries is less than that of the small State of Belgium. A large part of the foreign trade is in the hands of English, German, French, and other foreigners established at the seaports. The following is a statement of the average annual trade of the country in millions of dollars:

	1881–85	1891–95	1899	1900	1901
Imports	275.0	234.5	306.1	322.7	269.5
Exports	290.0	314.0	309.7	369.2	375.7

The above table includes only the trade across the European boundary or through the ports connecting with the Atlantic; in other words, it includes very little of the Asiatic trade, nearly all of which crosses the Asiatic land boundary. The average exports through the Asiatic frontier for the ten years ending in 1900 were $11,220,000 a year; the average imports across the Asiatic frontier in the same period were $23,975,100. These figures include only the trade in general merchandise. The trade of Russia, exclusive of Finland, with the principal countries in 1900 and 1901 was:

	Imports from (1900)	Imports from (1901)	Exports to (1900)	Exports to (1901)
Germany	$111,614,405	$103,112,270	$96,632,025	$92,397,695
United Kingdom	65,450,320	53,157,785	74,971,640	80,502,740
France	16,295,595	13,828,780	29,586,750	31,518,000
Austria-Hungary	13,886,460	12,097,775	13,523,900	15,563,300
Turkey	3,725,850	3,764,135	9,404,415	10,904,735
United States	22,739,310	17,864,320	1,760,785	2,052,790
China	8,339,395	11,021,000	589,675	1,872,025
Finland	10,308,240	11,354,205	21,132,510	19,904,750

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The leading imports are raw and half manufactured articles, about one-half of the total (cotton, metals, coal, wool, silk, leather, hides, skins, chemicals, etc.); manufactured goods (machinery, metal goods, some textiles, etc.); articles of food (tea, fish, beverages, fruits, coffee, and tobacco). The leading exports are cereals and flour (more than half of the total), timber, naphtha and naphtha oils, flax and hemp, oil cake, oil grains, and other raw and half manufactured articles.

The growth of the export trade of the United States in 1901 and 1902 was chiefly due to the removal of the Russian tariff tax on some kinds of agricultural machinery. American sales of cotton and machinery are important. The United States purchases from Russia manganese ore, licorice, and some other commodities, but its imports are comparatively small because the United States produces in very large quantities most of the things that Russia has to sell. It may be observed that Russia's trade with its neighbors Austria-Hungary and Rumania is comparatively small because the products of the three countries are much the same. The trade of Finland is not included in the trade statistics of European Russia, as it forms a customs district by itself.

TRANSPORTATION AND COMMUNICATION. The wagon roads are generally in a very bad condition, especially in spring and autumn. In winter, however, when the whole plain of Russia is covered with snow, sledging is universal, and the land transport of goods is facilitated. The rivers and canals carry enormous commerce, and are the cheapest means of communication, in spite of the fact that they have natural disadvantages as highways. They are closed by ice from three to seven months in the year, and the southern rivers, most notably the Don, are much reduced in depth by the dryness of the summer. There are about 50,000 miles of navigation on rivers, lakes, and canals in European Russia. Over 1700 steamers ply on the Volga and its tributaries. There is direct water connection by river and canal between the Caspian Sea and the Arctic Ocean (2 routes); between the Caspian Sea and the Baltic (3 routes); and between the Black Sea and the Baltic (3 routes).

In 1902 the empire had 36,496 miles of railroad, of which 29,788 miles were in European Russia, 1762 miles in Finland, and 4545 miles in Asiatic Russia. The Government owns and operates nearly two-thirds of the mileage and has connected the extremities of the empire by rail. (See SIBERIA.) The freight carried by the Russian lines in 1900 was 146,543,000 tons; passengers, 101,570,000. In 1900 the freight carried by the Asiatic lines (Transcaspian, Trans-Siberian, and Ussuri River railroads) was 4,547,795 tons; passengers were 2,741,694.

The chief seaports are on the Baltic and Black seas. They are blocked by ice, except Odessa, Sebastopol, and Novorossysk on the Black Sea, and Hangö on the Baltic, from 2 to 5 months, but ice-breakers are mitigating this inconvenience. The Black Sea ports are the main outlets for agricultural produce. Most of the sea trade with North and Central Europe and the United States is through the Baltic ports. Odessa has the largest shipping trade, is the chief depot for the produce of South Russia (wheat, tallow, wool, and linseed), and has regular connection with all Black Sea ports, the chief Mediterranean and Atlantic ports of Europe, and the Pacific ports of Vladivostok and Dalny (the new port of the Province of Kwang-tung). Taganrog, Rostov, Berdiansk, and Mariupol are grain ports on the Sea of Azov, and Astrakhan on the Volga delta is the central point of the Caspian Sea trade. Saint Petersburg is the leading port of the Baltic. Riga is the most important shipping point in Western Russia for flax, hemp, and timber. Archangel, on the White Sea, has an important export trade in timber, tar, pitch, grain, and furs. Åbo, Hangö, Helsingfors, Revel, Libau, and some other ports are also important. The coasting trade is very large, and since January, 1900, only vessels sailing under the Russian flag can engage in it. The mercantile marine of Russia in 1901 consisted of 3038 vessels, of 633,819 tons, of which 745 were steamers, of 364,360 tons. In 1901 the total number of merchant vessels that cleared from the ports of European Russia in the foreign trade was 8,790, of 7,536,000 tons, of which only 1349 were Russian, of 713,000 tons. The number of vessels in the coasting trade clearing from the White, Baltic, Black, and Azov seas was 10,039, of 8,582,000 tons.

BANKING. The Bank of Russia is the State bank and also a commercial bank. It has 113 branches throughout the empire. It issues the paper currency of Russia as necessity occurs. If the amount of the paper currency does not exceed 600,000,000 rubles, the bank guarantees it by half of that sum in gold. Every issue above 600,000,000 rubles must be guaranteed to the full amount in gold deposited in the bank. The total amount of the paper currency on January 14, 1903, was 630,000,000 rubles, and the guarantee fund in gold to cover the currency was 927,500,000 rubles, or sufficient to cover a much larger issue of paper money.

The number of State, municipal, and postal savings banks on January 1, 1902, was 5,629; depositors, 3,935,773; deposits, 722,982,000 rubles. The State banks for mortgage loans to the nobility had outstanding loans amounting to 902,811,500 rubles on January 1, 1900. The land bank for the purchase of land by the peasants up to January 1, 1902, had lent money to 630,922 householders and 1,969,019 individuals, who had bought 11,296,800 acres, valued at 244,056,483 rubles, of which 191,588,006 rubles were lent by the bank and 52,468,427 were paid by the buyers. The 47 mortgage banks, on January 1, 1901, had 1,550,658,046 rubles in loans on landed estates and 446,115,772 on town properties. The assets and liabilities of 42 private banks balanced at 1,425,053,000 rubles; of 133 societies of mutual credit at 268,884,300 rubles; and of 241 municipal banks at 145,114,429 rubles.

GOVERNMENT. The government of Russia is an absolute hereditary monarchy. There is neither a written constitution nor a representative legislative body. The whole legislative, executive, and judicial power is vested in the Czar alone. He bears the title of Autocrat of All the Russias, and, as the title indicates, there are no legal limitations whatever upon his authority. There are, however, certain rules, for the most part relating to the law of succession, which the Czar regards as binding upon himself. He exercises the legislative and administrative power through the aid of certain great councils of State composed of functionaries appointed by himself and responsible to him alone for their conduct. The first of

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these bodies is the Council of the Empire, a purely consultative assembly established as early as 1801 and consisting of a president and over 80 members, exclusive of the ministers, who are ex-officio members, and four princes of the royal blood. For the dispatch of business the Council is divided into four sections or departments, each vested with the control respectively of legislation, civil and ecclesiastical administration, finance and commerce, industry and science. By one or the other of these sections legislative measures are drawn up, the laws interpreted in certain contingencies, the budget prepared, financial measures devised, accounts examined, administrative controversies settled, and political questions discussed. Each section has its own president, and ordinarily the sittings are separate, but joint meetings are held for certain purposes.

Another great body of State through which the Emperor governs is the Senate, which was created by Peter the Great in 1711 and reorganized in 1802. It is divided into six departments or sections. Two of these act as courts of cassation. Their members, like the other Senators, are appointed by the Emperor, but, by reason of their judicial functions, are regarded as irremovable. Another section is charged with the promulgation and execution of the laws. Other sections divide among themselves the business of supervising the collection of the taxes, the use of the public funds, the preservation of the archives, the appointment of officers, and the maintenance of order. As a whole, the Senate is the final supreme court of appeal in civil and criminal cases for the empire, a supreme administrative court, and a disciplinary tribunal for the trial of public officers. A third administrative body is the Holy Synod, charged with the supervision of ecclesiastical affairs. It is composed mostly of ecclesiastics, viz.: The three metropolitans of Saint Petersburg, Moscow, and Kiev, the archbishops of Georgia (Caucasus) and of Poland, and several bishops. There is one lay functionary with the title of Procurator-General, who is also a member. All the members are appointed by the Emperor. The Synod cannot introduce innovations into the Church, but it exercises control over the Church in matters of discipline and superintends its higher administration. Its decisions are made in the name of the Emperor and have no force until approved by him. The fourth great organ of Imperial administration is the Council of Ministers, which dates from the year 1802. The ministers, thirteen in number, are appointed by the Emperor, and are responsible to him alone. Besides the Ministry, the Czar has his private Chancelleries, charged mainly with the administration of public charities and certain branches of public education, the examination and publication of the laws, and the control of certain branches of the police service.

For the government of Poland and Finland special arrangements are made. In Poland the chief representative, or lieutenant, of the Emperor is the Governor-General, who is assisted by a council. He is also the president of a deliberative assembly, composed of permanent and temporary members, all appointed by the Emperor. (For the government of Finland, see FINLAND.) The Russian Empire is divided for administrative purposes into governments and provinces and one district. At present there are 96 governments and provinces and one district, for a list of which see table below under POPULATION.

The provinces altogether number 18, all of which are in Asia and the Caucasus. Several of the governments are united under the rule of a Governor-General. In each single government there are a deliberative assembly and a civil governor, while in a number there is also a military governor. Each government is divided into districts numbering from 5 to 15. In each district is also a deliberative assembly (Zemstvo) elected by three classes of voters, viz. proprietors, burghers, and inhabitants of the rural communes who are 25 years of age and possess a certain amount of property, or who are engaged in businesses of a certain importance. Members of the district assemblies are chosen for three years and receive no compensation. Their duties include the construction of public works, administration of charity, public health, public education, and other matters of local concern. The administration of the municipalities is vested in a mayor (*Golova*) and an elected council or deliberative assembly (*Duma*). The members of the council are chosen by property-owners, who are divided into three classes, each class choosing an equal number of members. Its duties include the maintenance of the public health and security, the care of markets, ports, charitable institutions, hospitals, and libraries, and the general supervision of municipal affairs. A law of 1894 has materially reduced the power of the municipal government and placed it largely under the control of the Imperial Government.

The lowest administrative unit is the commune, of which there are over 107,000 in European Russia. The chief executive officer of the commune is the *Starosta*. Other officers are the tax collector, the treasurer, school trustees, hospital inspectors, etc. They are elected by the communal assembly (*mir*). This is a popular meeting of all the householders in the commune. It has many elements in common with the New England town meeting. Its duties include the regulation of all local affairs of communal interest. Among these may be mentioned the preparation of the communal budget, the voting of the taxes and the apportionment of those taxes due the empire, and the periodical division of the land (which is generally held in common) among the families comprised in the commune. It grants permission to peasants who wish to change their residences, passes upon the admission of new members to the commune, appoints guardians for minors, tries petty criminal cases, and imposes penalties. Usually a majority vote is sufficient to validate any action of the *mir*, though in some cases a two-thirds vote is required. The *Starosta* serves as moderator of the assembly. He supervises the execution of its resolutions, has control of the police, and has charge of the disbursement of the communal funds. Several communes grouped together form a canton or *volost*, of which there are over 10,000 in European Russia. Each is presided over by an elder (*Starshina*) elected by the cantonal assembly composed of representatives of the communes on the basis of one member to every ten families. It discharges the same duty for the canton that the *mir* does for the commune. It meets in the most important or the most central village of the commune. The *Starshina* is assisted by a council. His term of ser-

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vice is three years and is obligatory unless the appointee is 60 years of age or has serious infirmities. Another cantonal institution is a court consisting of from 4 to 12 judges elected by the cantonal assembly. It has jurisdiction of misdemeanors and disputes among the peasants concerning property where not more than 300 rubles in value are involved. The capital of the Russian Empire is Saint Petersburg.

FINANCE. The revenue and expenditure of the State are classed under the heads of ordinary and extraordinary revenue and expenditure. The revenue and expenditure for the years 1900 and 1901 were as follows, in rubles:

	Ordinary		Extraordinary	
	Revenue	Expenditure	Revenue	Expenditure
1900...	1,704,128,506	1,555,427,622	82,568,983	333,788,515
1901...	1,799,457,155	1,664,887,251	163,915,915	209,369,808

The ordinary revenues are in 9 classifications. The receipts under each heading in 1900 are here given:

(1) Direct taxes, 130,890,050 rubles (from taxes on land, forests, and capital, and sale of trade licenses). (2) Indirect taxes, 686,630,944 (from customs duties and imposts on spirits, tobacco, sugar, matches, and naphtha). (3) Duties, 94,621,466 (from stamp duties, passports, railroad taxes, etc). (4) State monopolies, 223,394,391 (mining, mint, posts, telegraphs and telephones, and sale of spirits). (5) State domains, 493,764,570 (rentals from crown lands, forests, and mines, net earnings of State railroads, interest on crown capital, etc.). (6) Sales of domains, 741,208. (7) Redemption of land, 89,970,491 (payments made on land purchased by liberated serfs and crown peasants). (8) Miscellaneous, 71,905,642 (payments on railroad and crown debts, aid from municipalities, military contribution, etc.). (9) Various, 7,538,393. The extraordinary revenue was derived from interest on the perpetual deposits in the Bank of Russia, interest on State loans, and various other sources, making a total of 163,915,915, or a grand total of 1,963,373,070 rubles. The balance of ordinary revenue from previous years was 35,350,365 rubles and from extraordinary revenue, 184,373,631 rubles, bringing the total up to 2,019,181,151 rubles, showing a surplus of 144,924,092 rubles over the total expenditures for the year.

The expenditures ordinary and extraordinary in 1901 were as follows:

A. Ordinary: State debt, 276,550,025 rubles; higher institutions of State, 3,305,445; Holy Synod, 24,070,702. Ministries: Imperial House, 12,924,491; foreign affairs, 5,374,877; war, 334,606,006; navy, 93,046,114; finances, 308,490,229; agriculture and State domains, 41,137,269; interior, 87,832,526; public instruction, 33,441,370; ways of communication, 388,551,405; justice, 46,058,216; State's comptrol, 7,112,677; State's studs, 1,585,899; various, 800,000. Total ordinary, 1,664,887,251.

B. Extraordinary: Building of new railways, 37,369,979 rubles; payment of consolidated railway bonds, 82,000,000; China war, 43,675,441; various, 46,324,388. Total extraordinary expenditure, 209,369,808. Grand total, 1,874,257,059. The national debt on January 1, 1902, amounted to £684,504,661; net interest, £30,288,917.

WEIGHTS, MEASURES, AND MONEY. The unit of coinage is the silver ruble of 100 kopecks, of the average value of 51 cents. The imperial and half imperial are gold coins of 15 and 7.5 rubles. Gold pieces of 10 and 5 rubles are now coined. Legal-tender credit notes (100, 25, 10, 5, and 3 rubles and 1 ruble) are also issued. The unit of measurement is the arshin (28 inches). The verst equals 3500 feet, or two-thirds of a statute mile. The unit of weight is the pound (funt), equaling 9-10ths of a pound avoirdupois. The pood is equivalent to 40 Russian or 36 American pounds. The meter, kilogram, and their subdivisions may legally be used.

ARMY AND NAVY. See ARMIES; NAVIES.

POPULATION. The population of the Russian Empire according to the census of 1897 was 129,562,718. The growth of population has been remarkably rapid, the large natural increase going hand in hand with the enormous widening of the bounds of the empire. The population in 1722 was about 14,000,000; in 1815, 45,000,000; in 1851, 68,000,000; and in 1903 it was estimated at 141,000,000.

The following is a table of the Russian governments, provinces, and territories, with their areas, populations, and capitals (in some cases only estimates being obtainable):

EUROPEAN RUSSIA (PROPER) GOVERNMENTS	Area, sq. miles	Population (1897)	Capital
Archangel or Arkhangelsk	326,500	347,589	Archangel
Astrakhan	91,337	994,775	Astrakhan
Bessarabia	17,619	1,933,436	Kishinev
Courland	10,535	672,634	Mitau
Don Cossacks, Province of the	63,532	2,575,818	Novotov
Ekaterinoslav	24,478	2,112,651	Ekaterinoslav
Esthonia	7,818	413,724	Reval
Grodno	14,931	1,617,859	Grodno
Kaluga	11,942	1,185,726	Kaluga
Kazan	24,601	2,204,027	Kazan
Kharkov	21,041	2,509,811	Kharkov
Kherson	27,523	2,732,832	Kherson
Kiev	19,691	3,576,125	Kiev
Kostroma	32,490	1,429,228	Kostroma
Kovno	15,524	1,549,444	Kovno
Kursk	17,937	2,603,205	Kursk
Livonia	18,158	1,300,640	Riga
Minsk	35,293	2,156,123	Minsk
Mohilev	18,522	1,708,041	Mohilev
Moscow	12,875	2,433,356	Moscow
Nizhni-Novgorod	19,797	1,600,304	Nizhni-Novgorod
Novgorod	47,236	1,392,933	Novgorod
Olonetz	57,439	366,175	Petrozavodsk
Orel	18,060	2,054,749	Orel
Orenburg	73,816	1,609,388	Orenburg
Penza	14,997	1,491,215	Penza
Perm	128,211	3,003,208	Perm
Podolia	16,240	3,031,513	Kamenets-Podolsk
Poltava	19,265	2,794,727	Poltava
Pskov	17,070	1,136,540	Pskov
Ryazan	16,261	1,827,085	Ryazan
Saint Petersburg	20,760	2,107,691	Saint Petersburg
Samara	58,321	2,763,478	Samara
Saratov	32,624	2,419,884	Saratov
Simbirsk	19,110	1,549,461	Simbirsk
Smolensk	21,638	1,551,068	Smolensk
Tambov	25,720	2,907,519	Tambov
Taurida	24,497	1,443,566	Simferopol
Tchernigov	20,233	2,322,007	Tchernigov
Tula	11,954	1,432,743	Tula
Tver	25,225	1,812,825	Tver
Ufa	47,130	2,220,497	Ufa
Vilna	16,420	1,591,912	Vilna
Vitebsk	17,440	1,502,916	Vitebsk
Vladimir	18,864	1,570,733	Vladimir
Volhynia	27,743	2,997,902	Zhitomir
Vologda	168,900	1,365,587	Vologda
Voronezh	25,450	2,546,255	Voronezh
Vyatka	59,329	3,082,788	Vyatka
Yaroslav	13,751	1,072,478	Yaroslav
Sea of Azov	14,520		
Total of European Russia (Proper)	1,910,368	94,626,191	

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POLAND GOVERNMENTS	Area, sq. miles	Population (1897)	Capital
Kalish	4,392	846,719	Kalish
Kielce	3,897	763,746	Kielce
Lomza	4,667	585,781	Lomza
Lublin	6,503	1,159,463	Lublin
Piotrkow	4,735	1,406,951	Piotrkov
Plock	3,674	556,877	Plock
Radom	4,470	820,363	Radom
Siedlce	5,535	797,725	Siedlce
Suvalky	4,852	738,362	Suvalky
Warsaw	5,625	1,933,689	Warsaw
Total Poland	48,350	9,609,676	

GRAND DUCHY OF FINLAND GOVERNMENTS	Area, sq. miles	Population (1897)	Capital
Åbo-Björneborg	9,336	419,300	Åbo
Kuopio	16,499	313,539	Kuopio
Nyland	4,584	276,335	Helsingfors
Saint Michel	8,819	186,478	Saint Michel
Tavastehus	8,334	285,281	Tavastehus
Uleåborg	63,957	268,226	Uleåborg
Vasa	16,100	446,772	Vasa or Nikolaistad
Viborg	13,525	394,412	Viborg
Lake Ladoga	3,094		
Total Finland	144,248	2,590,343	
Total European Russia (proper) including Poland and Finland	2,102,966	106,826,210	

CAUCASUS GOVERNMENTS AND PROVINCES	Area, sq. miles	Population (1897)	Capital
Baku	15,095	789,659	Baku
Black Sea	2,836	54,228	
Daghestan	11,332	586,636	Temir-Khan Shura
Erivan	10,075	804,757	Erivan
Kars	7,188	292,498	Kars
Kuban	33,650	1,922,773	Yekaterinodar
Kutais	14,100	1,075,861	Kutais
Stavropol	23,430	912,639	Stavropol
Terek	28,150	933,485	Vladikavkaz
Tiflis	17,200	1,040,943	Tiflis
Yelizavetpol	16,721	871,557	Yelizavetpol
Total Caucasus	179,777	9,285,036	

SIBERIA GOVERNMENTS AND PROVINCES	Area, sq. miles.	Population (1897)	Capital
Amur	172,848	118,570	Blagovestchensk
Irkutsk	287,061	506,500	Irkutsk
Maritime	714,853	223,336	Vladivostok
Saghalien	29,336	28,113	Alexandrovsk
Tobolsk	539,659	1,438,484	Tobolsk
Tomsk	331,159	1,929,092	Tomsk
Transbaikalia	236,868	664,071	Chita
Yakutsk	1,533,397	261,731	Yakutsk
Yeniseisk	987,186	559,902	Krasnoyarsk
Total Siberia	4,832,367	5,729,799	

CENTRAL ASIA GOVERNMENTS AND PROVINCES	Area, sq. miles	Population (1897)	Capital
Akmolinsk	229,609	678,957	Omsk
Ferghana	35,654	1,560,400	Khokand
Samarkand	26,627	857,847	Samarkand
Semipalatinsk	184,631	685,197	Semipalatinsk
Semiryetchensk	152,280	990,107	Vyernyi
Syr-Darya	194,853	1,479,848	Tashkent
Turgai	176,219	453,123	Turgai
Transcaspian	214,237	372,193	
Uralsk	125,100	644,001	Uralsk
Caspian Sea	169,381		
Lake Aral	26,166		
Total Central Asia	1,534,757	7,721,673	
Total Russia in Asia, including all Caucasus	6,546,901	22,736,508	
Grand Total Russian Empire	8,649,867	129,562,718	

The average increase of the population of the empire (exclusive of Finland) through excess of births over deaths in the five years 1895-99 was 1,968,807 a year. In recent years there has been a large emigration to the United States, made up in great part of Jews. In the 28 years ending in 1900 this emigration reached a total of 839,364. The empire has only seven cities of over 200,000 inhabitants, viz.: Saint Petersburg, with an estimated population at the beginning of 1902 of 1,489,570; Moscow, 1,147,245; Warsaw, 641,936; Odessa, 414,218; Lodz, 316,145; Riga, 260,717; and Kiev, 255,699.

EDUCATION. Russia is much behind most of the nations of Western Europe in education. The efforts of Peter the Great and his successors were entirely concerned with the upper classes and higher education. The continuous exertions of the Government are the source of the refined culture of the upper classes, of the numerous scientific institutions, the multiplication and improvement of universities and middle schools, and the better training of the clergy. But, in consequence of the existence of serfdom, no account was taken of the masses of the people till Alexander II. aimed at universal popular education. Since that time great progress has been made, but, owing to the sparsity of the population and the differing levels of civilization throughout the empire, it will be long before a high average of education is attained. Not half of the children of school age actually attend school. Most of the schools of the empire are under the Ministry of Public Instruction and the entire empire is divided into 15 educational districts. Many normal, technical, and other special schools are supported by one or another department of the Government or the Holy Synod or are conducted as private institutions. The university students numbered 17,299 in 1902.

RELIGION. The orthodox Greek faith is the established religion of the empire, and according to official estimates its adherents are about 70 per cent. of the entire population. The adherents of the various faiths number approximately (1903):

Orthodox Greek (including dissidents)	100,000,000
Catholics	12,000,000
Protestants	6,000,000
Other Christians	1,000,000
Mohammedans	14,000,000
Jews	5,000,000

To this must be added some millions of Buddhists and pagans. The Jews are placed under grievous restrictions, and various sects of dissenters from the established faith and the followers of certain new creeds, some of them extremely fanatical, have been subjected to severe restraints and even to persecution. Roman Catholics are most numerous in Poland. Lutherans in the Baltic Provinces, Mohammedans in the eastern and southern part of the empire, and the Jews in the towns and cities of the western and southwestern provinces. The Greek churches in the empire numbered 66,146 in 1898 (including 718 cathedrals). The empire is divided into 64 bishoprics, which are under 3 metropolitans, 14 archbishops, and 48 bishops. The monasteries number 785 (including 289 nunneries), with about 8000 monks and 9000 nuns. The clergy exercise very great influence over the mass of the people. See GREEK CHURCH.

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ETHNOLOGY. The Russian Empire is populated mainly by a Slav group of the Caucasic stock, belonging to the Alpine or brachycephalic type. The true Russians constitute nearly three-fourths of the population of Russia in Europe, the rest being Letto-Lithuanians, Poles, Jews, Finns, Turco-Tatars, Mongols, and Germans. The true Russians are divided into three groups: (1) Great Russians or Muscovites, about 60,000,000, occupy the entire centre of European Russia and form two-thirds to three-fourths of the population in the north and east. (2) The Little Russians or Malo-Russians, otherwise called Ukrainians or Ruthenians, about 18,000,000, are in the southwest. The Cossacks are Little Russians in speech. They are settled in a compact body in Little Russia, whence they have thrown off colonies to the southeast. (3) The White Russians number 5,000,000 in four governments in the west. There are upward of 6,000,000 Russians in Asiatic Russia. See Colored Plate with EUROPE, PEOPLES OF.

Other peoples living in the Russian Empire are as follows: *Slavic:* Poles, about 8,000,000, about three-fourths of them in Poland, the bulk of the remainder being in the western governments of Russia proper; about 200,000 Bulgarians, and a few Czechs and Serbs. *Teutonic:* Germans, about 2,000,000, mainly in the Baltic Provinces, Poland, and in colonies in South Russia; Swedes, 300,000, mainly in Finland. *Finnic:* Finns and Karelians, about 2,500,000 in Finland and the neighboring parts of Russia proper; Esthonians, about 650,000 in the Baltic regions; Mordvins, Votyaks, Tcheremisses, and other kindred peoples scattered over a large area in Northern and Eastern Russia, about 1,500,000; Lapps, in Lapland, and Samoyeds in the extreme northern parts of Russia and Siberia. *Letto-Lithuanian:* Letts and Lithuanians, about 3,500,000, the former in the Baltic region, the latter in the western governments and Poland. *Iranian:* Armenians, Kurds, and Persians and other tribes, 1,300,000, principally in the Caucasus. *Daco-Roman:* Rumanians, 1,000,000, in Southwest Russia. *Semitic:* Jews, about 5,000,000, in Western and Southwestern Russia and Poland. *Caucasus Aborigines:* Georgians, Mingrelians, Lesghians, etc. *Turco-Tatar:* Tatars, Uzbegs, Bashkirs, Kirghiz, Turkomans, etc., in all about 9,000,000. *Mongol:* Kalmucks, in Russia and Central Asia; Buriats, Tunguses, etc., in Siberia. The Mongols, not reckoning the inhabitants in the portion of Manchuria recently occupied by Russia, number less than 1,000,000. Besides these there are in Russia 1,000,000 Europeans of various nationalities and a considerable number of Gypsies.

There is an almost inexhaustible literature on the archæology, ethnology, and languages of Russia. For the general reader it is practically inaccessible, being locked up in the native language. A list of the principal works will be found in the supplement to Ripley's *Races of Europe*. See also: Smirnof, *Ethnographie préhistorique de la Russie centrale et du nordest* (Moscow, 1892); Sergi, "Varietà umane della Russia e del Mediterraneo" (*Atti Soc. Romana de Antrop.*, vol. i., 1893, also vol. v., 1897); Zeuss, *Les peuples de la Russie* (Moscow, 1892); Zograf, *Les peuples de la Russie* (Moscow, 1895); Bonmariage, *La Russie d'Europe* (Brussels, 1903).

HISTORY. In ancient times the Russian plains were for the most part outside of the known world and were spoken of as inhabited by wild Scythian and Sarmatian tribes and, farther away, in the unknown, by those to whom the ancients gave the name of Hyperboreans. Later the Slavs from the Baltic and the banks of the Elbe and the Danube spread over the plains to the eastward. Their organization was tribal and there was among them no capacity for unified systems to moderate their tribal conflicts. There were centres like Novgorod and Kiev that assumed, by the ninth century, a certain importance, but there was no national unity. About the middle of the ninth century, a Scandinavian leader, Rurik, came to Novgorod with a band of warlike followers in response to an invitation to establish order and unity. From this event the Russian historians date the beginning of the Russian Empire, the foundation of which they place in the year 862. To the Slavs the Scandinavians (Norsemen) were known as Varangians. According to one theory the followers of Rurik bore the name of Russians, which was engrafted upon the Slavic people in whose nationality they were soon absorbed. Others maintain that the name existed before this time as the designation of the inhabitants of the plains about Kiev. Some of the Varangians went on and established themselves at Kiev. Oleg (879-912), acting as regent for Igor, son of Rurik, made Kiev the capital of the embryo empire, subduing the neighboring tribes, and even made a successful raid against Constantinople. Igor (912-945) was succeeded by his widow Olga (945-957), who was baptized in 955 by the Patriarch of Constantinople, and abdicated soon after in favor of her son, Sviatoslaff (957-972), a warlike pagan, who was treacherously murdered. The principality was then divided among his three sons, and the quarrels usual in such cases followed, continuing till Vladimir the Great (980-1015), the youngest son, became sole ruler. The Varangians now became amalgamated definitely with the Slavic race. Vladimir's successful wars extended the boundaries of Russia to Lake Ilmen on the north, to the mouth of the Oka on the east, to the falls of the Dnieper on the south, and to the sources of the Vistula on the west. He became a convert to Greek Christianity, and in 988 was baptized with his followers. The nation soon adopted its ruler's religion and a metropolitan, subject to the Patriarch of Constantinople, was established at Kiev. Vladimir followed the evil example of his father in dividing his dominions. After his death dissensions broke out among his sons. For a time Sviatopulk (1015-19) ruled as Grand Prince of Kiev, but he was overthrown by his brother, Yaroslaff, who held the mastery over Kiev till his death in 1054. Under this prince the first code of Russian laws, the *Ruskaya Pravda*, was compiled. Yaroslaff's sons shared the principality among them. Each of these princes in turn divided his portion of territory among his sons, till the realm became an agglomeration of petty States. A state of anarchy, confusion, and petty warfare was perpetuated and ceased only after a lapse of four centuries.

The principal subdivisions of Russia during this period were: Susdal, in the upper and central parts of the basin of the Volga, from which, in the beginning of the thirteenth century, grew the principalities of Tver, Rostov, and Vladimir; Tchernigov and Seversk, which occupied the

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basin of the Desna (an affluent of the Dnieper), extending nearly to the sources of the Oka; Ryazan and Murom, along the Oka basin and about the sources of the Don; Polotsk, including the basins of the Western Dvina and the Beresina; Smolensk, occupying the upper parts of the basins of the Western Dvina and the Dnieper; Volyhnia and Galicia (Halicz), the first in the basin of the Pripet (an affluent of the Dnieper), the second lying on the northeast slope of the Carpathian Mountains; Novgorod, by far the largest of all, occupying the immense tract bounded by the Gulf of Finland, Lake Peipus, the upper parts of the Volga, the White Sea, and the Northern Dvina; and the Grand Principality of Kiev, which, from its having been formerly the seat of the central power, exercised a sort of supremacy over the others. Novgorod (q.v.), from its position, became a flourishing commercial State, which rose to great power. The citizens chose their own princes, archbishops, and, in general, all their dignitaries. One of the chief factories of the Hanseatic League was established in Novgorod in the thirteenth century. The people of these various principalities enjoyed considerable liberty through the influence of the common council or vyetch, without which the Prince was almost powerless.

In 1163 the ruler of the Principality of Vladimir took possession of Kiev and proclaimed himself Grand Prince. In 1222 the Mongol tide of invasion, sweeping westward from Asia, reached the Polovtses, a nomadic tribe who ranged over the steppes between the Black Sea and the Don, and whose urgent prayers for aid were promptly answered by the Russian princes; but in a great battle, fought (1224) on the banks of the Kalka (a tributary of the Sea of Azov), the Russians were totally routed by Genghis Khan (q.v.). The Mongols did not follow up their victory for some time, but in 1237-38 Batu Khan (q.v.), at the head of a vast horde, conquered Eastern Russia, destroying Ryazan, Moscow, Vladimir, and other towns. The heroic resistance of Prince George of Vladimir cost the lives of himself and his whole army on the banks of the Siti (1238). The Mongol conqueror's career was arrested by the forests and marshes south of Novgorod, and he was forced to return to the Volga. In 1240 he swept over the southwest, destroying Tchernigov and Kiev; ravaged Poland and Hungary, defeating the Poles, Silesians, and Teutonic Knights on the field of the Wahlstatt (1241) and the Hungarians on the Sajó; but being checked in Moravia, and receiving at the same time the news of the Khan's death, he retired to Sarai, on the Akhtuba (a tributary of the Volga), which became the capital of the great khanate of Kiptchak (q.v.). The Mongol invasion destroyed the elements of self-government, which had already attained a considerable degree of development in Russia, arrested the progress of industry, literature, and the other elements of civilization, and threw the country more than two hundred years behind the other States of Europe. Oriental customs and methods became fixed among the people, separating Russia more and more with each generation from Western Europe. The principalities of Kiev and Tchernigov never recovered, and the seat of the metropolitan was removed to Vladimir. The dismal annals of this period were illumined for a short space by the deeds of Alexander Nevski (q.v.), Prince of Novgorod and Grand Prince of Vladimir (died 1263). In his time, however, even Novgorod was forced to submit to the Mongol domination. In the early part of the fourteenth century extensive territories, including Volhynia and Kiev, were conquered by the Lithuanians. At this time Eastern Russia consisted of the principalities of Susdal, Nizhni-Novgorod, Tver, Ryazan, and Moscow, and long and bloody contests took place between the two most powerful of these, Tver and Moscow, for the supremacy. Under Ivan Kalita (1328-40), the founder of the system of administrative centralization which prevailed down to the time of Peter the Great, Moscow became the paramount grand principality. Ivan's son and successor, Simeon the Proud (1340-53), followed in his father's footsteps. The Grand Prince Dmitri IV. (1362-89) profited by the weakness of the Mongol khanate to make the first attempt to shake off the foreign yoke under which the Russians had groaned so long. His brilliant victory over the Khan Mamai on the banks of the Don (1380), which gave him the surname of Donskoi, was the first step to liberation. Nevertheless, the Mongols succeeded in taking Moscow, exacted a heavy tribute from the people, and riveted their bonds more firmly than ever. Vassili (Basil) II. (1389-1425) conquered Rostov and Murom. Vassili III., the Blind (1425-62), reigned during a period of wars waged by various princes for the grand ducal throne; but from this period the division of power in Eastern Russia rapidly disappeared, internal troubles ceased, and the reunited realm acquired from union the power to cast off the Tatar yoke.

These results were achieved by Ivan III. (1462-1505), surnamed "the Great," who availed himself of every opportunity for suppressing the principalities which owed him allegiance as Grand Prince. The Republic of Novgorod, the last of the native Russian States, was added to the empire of Ivan in 1478. He then took advantage of the dissensions between Achmet, Khan of the Golden Horde, and Mengli-Gherai, Khan of the Crimean Horde, to deliver Russia by uniting with the latter. This coalition destroyed the power of the Golden Horde in 1480, and the yoke of the Mongols was broken. Ivan next turned his attention to the western provinces, which had formerly belonged to the descendants of Saint Vladimir (the Great), but were now in the hands of the Lithuanians. The adherents of the Greek Church were oppressed by the Catholics, and hailed the advance of Ivan's army as a deliverance from persecution. Ivan won a battle, but it was followed by no results of importance. Ivan married (1472) Sophia, a niece of Constantine Palæologus, the last Byzantine Emperor. He introduced into his Court the splendor of Byzantium, adopted the Byzantine Imperial eagles, and united the existing edicts into a body of laws, the *Sudebnik*. Vassili IV. (1505-33) followed closely his father's policy, made war upon the Lithuanians, from whom he took Smolensk, and incorporated with his dominions the remainder of the small tributary principalities. His son, Ivan IV. (1533-84), surnamed "the Terrible," became monarch at the age of three years, and the country during his long minority was distracted by the contentions of the factious nobility or boyars (q.v.) who strove for power. On his attaining his majority, however, in 1547,

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in which year he assumed the title of Czar, he found two wise and prudent counselors, Silvester and Adatcheff, who, with his queen, Anastasia Romanoff, exercised over him a most beneficent influence. Ivan's arms were everywhere victorious; the fortified city of Kazan was captured in 1552, the khanate, of which it was the capital, was annexed to his empire, and the Khanate of Astrakhan shared the same fate soon after (1554). The marauding Tatars of the Crimea were held in check, and the Knights of the Sword were driven from Livonia and Esthonia. Many internal improvements were made, and the commerce between England and Russia by way of the White Sea was inaugurated. The latter part of Ivan's reign, following the death of his wife, was marked by savage cruelty. Stephen Báthory, King of Poland, wrested Livonia from him, and the Crim-Tatars, in 1571, invaded Russia, and burned Moscow. It was during the reign of this monarch that Western Siberia was conquered for Russia by the Cossack Yermak. (See SIBERIA.) Ivan's son, Feodor (1584-98), was a feeble prince, who intrusted his brother-in-law, Boris Godunoff (q.v.), with the management of affairs. Feodor was the last reigning monarch of the House of Rurik. He died childless, and his only brother, Dmitri, was murdered, in 1591, by order of Godunoff, according to popular rumor. After the death of Feodor representatives of all classes were convoked at Moscow to elect a new sovereign, and their choice fell on Boris Godunoff (1598-1605). The mysterious death of Dmitri favored the appearance of pretenders to his name and rank, the first of whom (see DEMETRIUS), on the sudden death of Boris Godunoff, was crowned in 1605. A revolt, headed by Prince Vassili Shuiski (1606-10), soon broke out, the Czar was murdered, and Shuiski was elevated to the vacant throne as Vassili V. But a second false Dmitri now appeared, and Sigismund of Poland, whose son, Ladislas, had been elected Czar by the boyars, invaded Russia, and took possession of Moscow (1610). At the same time hordes of Tatars and bands of Poles and robbers devastated the provinces. There followed a national uprising under Minin Pozharsky, who retook the capital, drove the Poles out of Russia, and convoked an assembly of representatives, who unanimously chose for their Czar Michael Feodorovitch Romanoff (1613-45). See ROMANOFF.

The new monarch put an end to the revolt of the Don Cossacks, and to the depredations of the robber gangs in the southwest. In 1618 and 1634 he purchased peace from the Poles at the cost of Smolensk and a portion of Seversk. Alexis (Alexei) (1645-76), Michael's son and successor, being a minor, the nobles seized the opportunity of increasing their power and exercising oppression and extortion over their subjects, till rebellion broke out in various districts. The changes and corrections in the books and liturgy of the Church introduced by the Patriarch Nikon brought about the rise of a dissident sect. (See RASKOLNIKS.) Little Russia was acquired by the voluntary submission of the Cossacks (see POLAND), who had revolted against the oppression of the Polish magnates. In the war with Poland which followed, Russia acquired Smolensk with part of White Russia, and all of the Ukraine east of the Dnieper, together with Kiev. Alexis was succeeded by his son Feodor (1676-82), under whom the first war between Russians and Turks was brought to a successful issue. After Feodor's death, the general council, in accordance with his wishes and their own, chose his half-brother Peter as Czar, but his half-sister Sophia, an able and ambitious princess, succeeded in obtaining the reins of power as Princess Regent and in having her own brother, the half-witted Ivan, proclaimed co-ruler with Peter. After an attempt to deprive Peter of the throne, she was forced to resign all power and retire to a convent. Her accomplices were executed, and Peter (1689-1725) became sole ruler, although Ivan was allowed to retain the empty title of Czar until his death in 1696. The history of Russia under Peter I., the Great, is a biography of that monarch. (See PETER I.) His reign was one of tremendous energy and national development, although much of his work was ill-timed. He attempted to transform the semi-Oriental society of Russia, by main force of autocracy, into an Occidental society, and to make Russia a European power. This was done without consulting the national character or the natural conditions of the country, and produced that sharp conflict of opposing elements which has since been a source both of weakness and of strength to Russia. Peter's schemes for the territorial aggrandizement of the empire, as continued by his successors, were carried out in turn at the expense of Sweden, Poland, and the Turks. The Russians were decisively defeated by Charles XII. at Narva in 1700, but Peter nevertheless succeeded in making himself master of Ingermanland, on the Gulf of Finland, and parts of Esthonia and Livonia, and in 1703 laid the foundations of his new capital, Saint Petersburg, on the banks of the Neva. Profiting by defeat, he brought into being a well-disciplined army with which he crushed the Swedish King at Poltava (q.v.) in 1709. By the Peace of Nystad (1721) Russia was confirmed in possession of Livonia, Esthonia, Karelia, and Ingermanland. Azov had been taken from the Turks in 1696 and transformed into a base for the naval power which Peter hoped to establish on the Black Sea, but as a result of the Czar's unfortunate campaign beyond the Pruth, it was retroceded to the Sultan by the Treaty of Hush (1711).

Peter's only son, Alexei, had shown himself inimical to his father's political schemes and had met a premature death in 1718 (see ALEXEI PETROVITCH), and the crown passed by will to Peter's wife, Catharine I. Her short reign of two years was followed by that of the unfortunate Alexei's son, Peter II. (1727-30), who was entirely under the influence of the powerful family of the Dolgoruki. Upon his death the privy council, setting aside the other descendants of Peter the Great, bestowed the crown on Anna, the daughter of his imbecile brother, Ivan. Anna Ivanovna (1730-40) freed herself from the domination of the Dolgoruki and the Golitzin, but was entirely under the influence of the German party, chief among whom were her favorite Biron (q.v.), Marshal Münnich, and the Chancellor Ostermann. From 1736 to 1739 war was carried on against the Turks, and the Russians, under Münnich, took Azov, overran the Crimea, and advanced to the mouth of the Dnieper. Deserted by its ally, Austria, Russia derived little profit from these conquests outside of the recovery of Azov. Anna

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Ivanovna was succeeded by Ivan (1740-41), the infant son of her niece, Anna Karlovna (q.v.), under the regency of Biron. Biron was speedily overthrown and Anna Karlovna assumed the regency, but only to succumb to a palace conspiracy, which placed on the throne Elizabeth Petrovna, the daughter of Peter the Great. Elizabeth (1741-62) joined Austria against Prussia in the Seven Years' War (q.v.) and showed herself the relentless foe of Frederick the Great. The Russian armies gained victories over the Prussians at Grossjägerndorf (1757) and Kunersdorf (1759), and for a moment Berlin itself beheld the presence of Russian troops (1760). The death of Elizabeth (1762) saved Frederick in his desperate straits, for her successor, Duke Peter of Holstein-Gottorp, a son of Peter the Great's second daughter, Anna Petrovna, was a fervent admirer of the Prussian monarch, with whom he entered into an alliance. In July, 1762, Peter III. was dethroned as the result of a conspiracy headed by his wife, a princess of Anhalt-Zerbst; some days afterwards he was murdered and his wife ascended the throne as Catharine II. (1762-96).

Catharine's talents were on the same scale as her vices. She furthered the spread of Western civilization in Russia, introduced important administrative changes in the government, enacted laws favorable to the development of commerce and industry, founded schools and charitable institutions, and granted religious liberty to the Raskolniks. Abroad Catharine carried out with striking success her ambitious schemes for the aggrandizement of Russia. She was the guiding spirit in the spoliation of Poland (q.v.), in the three partitions of which (1772, 1793, 1795) Russia gained 180,000 square miles of territory with 6,000,000 inhabitants. Two successful wars were carried on against the Turks, the first of which (1768-74) was terminated by the Peace of Kutchuk-Kainardji, in which Turkey renounced her suzerainty over the Crimea and other Tatar regions. The Crimea was incorporated with Russia in 1783. The second war (1787-92) was concluded by the Peace of Jassy, which advanced the Russian frontier to the Dniester. Paul I. (1796-1801), son and successor of Catharine, was engaged continually in a struggle with the aristocrary, by whom he was cordially hated. His alternating rigor and indulgence alienated all the influential classes. He placed the press under a severe censorship and established a system of secret police. He joined the coalition against France and then withdrew from it and was preparing to make war against England when he was assassinated by conspirators.

Alexander I. (1801-25) was a lover of peace and largely imbued with the humanitarian ideas of the eighteenth century. He began his reign auspiciously by abolishing serfdom in the Baltic Provinces and establishing a number of ministries for the more efficient administration of the empire. He joined the third coalition against France, and his share in the defeat at Austerlitz (1805) did not deter him from allying himself with Prussia in the following year. The indecisive slaughter at Eylau (q.v.) and the crushing defeat of the Russians at Friedland (June 14, 1807) led to the famous meeting between Napoleon and Alexander at Tilsit, where the Russian Emperor, in return for entering into Napoleon's schemes, was allowed a free hand in Sweden and Turkey. From the former Finland and the Aland Islands were wrested in 1809. Turkey, after a six years' contest, was compelled in the Treaty of Bucharest (May 28, 1812) to cede the land between the Dniester and the Pruth. Alexander's abandonment of the Continental system was followed by the invasion of Russia by the French (1812). Upon the disastrous termination of the campaign the Russian Emperor became the leading spirit in the alliance which carried the war into Germany and France and brought about the overthrow of Napoleon. (See NAPOLEON.) By the Congress of Vienna, in 1815, the bulk of the Duchy of Warsaw, which Napoleon had created in 1807 out of the dominions acquired by Prussia in the spoliations of Poland, was erected into the new Kingdom of Poland, which was placed under the sceptre of Russia. In the meanwhile the establishment of Russian dominion in the region of the Caucasus was proceeding rapidly. In 1801 Georgia was annexed, and in 1813 Daghestan, Baku, and Shirvan were acquired from Persia. The last ten years of Alexander's reign were a period of disillusionment for those who had expected the introduction of a liberal régime in Russia. The reign of Alexander's youngest brother, Nicholas I. (1825-55), opened with a rebellion on the part of the liberal element in behalf of his elder brother Constantine, who had renounced his title to the throne. Nicholas did not consent to assume the crown until it was evident that Constantine would not, and the imminent revolt demanded prompt action and a recognized sovereign. The rebellion, known as the rising of the Decembrists or Dekabrists, was crushed and the ringleaders were summarily dealt with. Soon after the accession of Nicholas, war with Persia broke out (1826), marked by a successful invasion of that country by Paskevitch (q.v.). The Treaty of Turkmantchai (February 22, 1828) gave part of Armenia to Russia. Russia took part in the destruction of the Turkish-Egyptian fleet at Navarino (1827), which event virtually secured the liberation of Greece. In 1828 Russia made a fresh onslaught upon Turkey. The victories of Wittgenstein, Paskevitch, and Diebitsch led to the Treaty of Adrianople (q.v.) in 1829, in which Turkey transferred to Russia the suzerainty over the tribes of the Caucasus, accorded to the Czar a protectorate over Moldavia and Wallachia, and agreed to recognize the independence of Greece. In 1830 the Poles revolted, drove out the Grand Duke Constantine, and organized a provisional government. They carried on a brilliant and aggressive campaign against the Russian forces until May, 1831, when the strength of Russia began gradually to overwhelm them. Warsaw capitulated on September 8th. On February 26, 1832, a new statute was promulgated by Nicholas I. treating Poland as a conquered State. (See POLAND.) In 1834 the conquest of the Caucasus, which occupied Russia for thirty years, was begun. In 1848-49 the Austrian Imperial Government, unable to suppress the Hungarian revolt, asked Russia for assistance. This was readily granted, because of the intimate connection of the Poles with the Hungarian movement, the success of which would have encouraged a new Polish insurrection. (See HUNGARY.) In 1853 Nicholas again made war upon the Ottoman Empire

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France and Great Britain, later joined by Sardinia, interfered, and the Crimea became the theatre of a bloody conflict. Sebastopol fell in September, 1855, six months after the death of Nicholas. The Treaty of Paris closed the struggle in 1856. Russia was compelled to part with a strip of Bessarabia, the Black Sea was neutralized, and the Russian protectorate over the Danubian principalities was abolished. See CRIMEAN WAR; EASTERN QUESTION.

The accession of the son of Nicholas, Alexander II. (1855-81), introduced a new era of internal reforms. The abolition of serfdom in 1861 created more than twenty millions of freemen, whom a system of State loans enabled to secure small farms on an installment plan of payment. Corporal punishment and the farming of the taxes were abolished. There were nominal reforms in the judiciary, separating judicial from administrative functions, but in fact this has not worked successfully. In the face of revolutionary agitation (see NIHILISM) the earlier reform tendencies of this reign gave way to a reactionary policy. The last Polish insurrection broke out in 1863 and was suppressed with extreme severity. By a succession of ukases the Kingdom of Poland was in the course of a few years incorporated in the Russian Empire. (See POLAND.) The administration of the Baltic Provinces was assimilated to that of the rest of the empire. Vast accessions were made to the dominions of Russia. In 1858 the Amur Land was formally made over to the Czar by China. The subjugation of the Caucasus was completed between 1859 and 1864. The establishment of Russian supremacy in Central Asia, which was begun under Peter the Great, was completed in this reign. In 1868 Samarkand was occupied and the Khan of Bokhara became a vassal of Russia. In 1873 Khiva became a subject State. In 1876 Khokand (Ferghana) was annexed. Skobeleff's capture of the Tekke fortress of Geok-Tepe in 1881 practically completed the conquest of the trans-Caspian country. Since that time Russia has been steadily organizing these provinces and providing for their settlement and strategic development by her great railway system. Russia had always been restive under the provision of the Treaty of Paris relating to the navigation of the Black Sea, and in 1870, upon the fall of the Emperor Napoleon III., who had been the chief sponsor for the treaty, the Russian Government intimated that it felt no longer bound by the provisions of the treaty. At the London conference of 1871 this claim was admitted by the powers. This was the beginning of a resumption of the aggressive attitude toward Turkey. The Porte's maltreatment of its Christian subjects and the Turkish atrocities in Bulgaria (q.v.) in 1876 led to a conference of the powers at Constantinople. This conference made certain proposals looking toward a reform in the Turkish administration. Upon the rejection of these proposals by Turkey Russia undertook to enforce them, and in April, 1877, declared war. The war was conducted with great energy by Russia, and in January, 1878, the Russian forces were in the vicinity of Constantinople. The war was closed by the Treaty of San Stefano (March 3, 1878), which was materially modified by the intervention of the powers through the Congress of Berlin. (See RUSSO-TURKISH WAR; BERLIN, CONGRESS OF.) In 1867 Russia gave up her vast possessions in Arctic America, transferring Alaska by sale to the United States.

There had for some time been increasing discontent among the people tending toward revolution. Nihilism only increased in consequence of the Government's repressive measures. There were numerous outbreaks, but in 1880 Alexander seemed to have returned in a measure to his earlier liberalism. The secret police was abolished, and Loris-Melikoff (q.v.), in whom there was general confidence, was appointed as Chief Minister with extraordinary powers. This seemed for a time to quiet the disorders, and as it was known that marked reforms were to be proposed, it was confidently hoped that agitation would cease altogether, but on March 13, 1881, the Emperor, while on his way to the Winter Palace in Saint Petersburg, was killed by the explosion of a bomb thrown by one of a group of revolutionary conspirators.

Alexander III. (1881-94), influenced no doubt by the reaction due to his father's assassination, took for his advisers the leaders of the extreme Russian and autocratic party. His policy was one of peace in Europe, though the advance of Russia in Central Asia continued to arouse concern in England. The acquisition of Merv in 1884 brought Russia close to Herat, the key to Afghanistan, the Buffer State of British India. For a moment, in 1885, war between Russia and England seemed imminent, but the difficulties were settled by the appointment of a joint commission, which adjusted the Afghan boundary. In 1891 the construction of the trans-Siberian railway was begun. Since 1887 close relations with France have been established and maintained, as an offset to the Triple Alliance of Austria, Germany, and Italy. The anti-Semitic agitation which began to affect Europe about 1880 started in Russia a legal and extra-legal persecution of the Jews, which has been continued, and modified only when its severity has brought forth protests from the other civilized peoples that could not be ignored. The Jews are confined by law to the Pale of Settlement, a belt extending from the Baltic to the Black Sea, chiefly through the Polish and adjoining provinces. Successive acts have expelled them from other parts of the empire, and they can only live outside the Pale by special privilege. Prohibited from acquiring real property, and thus prevented from becoming farmers, the Jews were forced to crowd into the towns, where they became artisans or engaged in mercantile pursuits. Great masses of them, unable to do anything in any of the fields left open to them, sank into poverty. With legal restrictions have come physical persecutions, at different times taking the form of riot and massacre. The most notable instance of this kind occurred in May, 1903, at Kishinev, the capital of the Government of Bessarabia, when more than fifty Jews were killed and the hospitals were filled with the wounded.

Alexander III. died November 1, 1894, and was succeeded by his son, Nicholas II. (q.v.). As Czarevitch, Nicholas had traveled in the Far East and through Siberia and acquired a better knowledge than any of his predecessors of the needs and possibilities of those regions. In his reign the development of Asiatic Russia by railways has been pushed steadily forward. After the intervention of Russia, with the other powers,

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at the close of the China-Japan War of 1894-95, Russia was able to obtain from China a lease (March 27, 1898) for twenty-five years of the Kwang-tung Peninsula, which was made a province. Here are the strong naval station of Port Arthur and the new port of Dalny, built by Russia. By the treaty with China providing for the construction of the Manchurian Railway, which is really a part of the great Siberian system, Russia maintains a military occupancy of Manchuria. After the Boxer troubles in China in 1900, this occupation, the original pretext of which was the protection of the railway, was so strengthened as to cause apprehension on the part of other nations that Russia was about to carry out in Manchuria her traditional Asiatic policy of absorption of such provinces belonging to weaker powers as might be available. In reply to the protests of the powers the Russian Government denied any such intention and asserted that the Russian troops would retire as soon as the state of the country would permit, but at the close of 1903 it had become evident that the Russian occupation of Manchuria was to be a permanency. This aggressive advance of Russia has caused strained relations with Japan. In recent years Russia has succeeded in great measure in bringing Persia under her influence. While thus extending the scope of her activities in Asia, Russia has not lost sight of her traditional policy of enlarging her possessions in Europe. It is the dream of Russian patriots to bring the whole Slavic world under the sceptre of the Czar (see PANSLAVISM) and to make good the claim of Russia as successor to the Byzantine or Greek Empire, in her capacity as the great Greek Christian power, by the occupation of Constantinople. In the internal affairs of the country the Russian nationalists have continued to be dominant, and the Russianizing of Poland, Finland, and other provinces has been pushed forward unsparingly. The liberal agitation, which has its centre and strongest impulse in the universities and which was supposed for a few years to have become dormant, has reawakened since the opening of the twentieth century and assumed an insistent attitude which renews the uncertainty as to the future of the Russian autocracy. In 1899 an order of the Czar created a commission to abolish transportation of criminals and substitute punishment by the courts, and to reform the whole system of punishment for crime. In 1898 a rescript of the Czar to the governments of the civilized powers on the subject of international peace led to the assembling in 1899 of the Hague Peace Conference (q.v.).

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RUSSIAN ARCHITECTURE. The indigenous architecture of Russia is a development of the Byzantine (q.v.). It is similar to that of Armenia, to that of the Caucasian region, and to that of Moldavia. The great peculiarity of the Russian style—that which makes it at once remarkable and recognized among other styles of building—is in the great extension given to the idea of the cupola or lantern, which in one form or another forms the principal roof of nearly all the churches in the land. For all these buildings are of the 'central type,' in contradistinction to the 'basilica type;' that is, they are arranged around a chosen centre which may be the sanctuary or the chief place for the congregation, and they are not drawn out into long parallel lines. Such a church, then, generally square, or nearly so in its main outlines, will be roofed by a central cupola covering the whole nave, which is nearly square, and at least four minor cupolas covering four chapels at the corners, while the aisles and porches between have minor roofs on a much lower level; or, as in the case of some of the large wooden churches, the rounded cupola will be replaced by a blunt spire built of timber and covered with plank, with four or eight sloping sides, while this pyramid may or may not terminate in a very small cupola, apparently studied from Persian design. The wooden churches are generally in the far north, and these share that peculiarity of Norwegian buildings of the same class, in being almost wholly without window openings. To keep out the cold wind of winter and to facilitate the warming by means of stoves, the worshipers are satisfied to use the light of lamps almost exclusively. The masonry churches of the centre and south are very like those of Athens and other places in Greece in their compact plan and generally in their small size, though none are quite as minute as well-known Grecian examples.

The official architecture of the empire, since the time of Peter the Great, has been largely a rather unsuccessful imitation of the supposed grand style of the eighteenth century. The massive Cathedral of Saint Isaac in Saint Petersburg is a marvelous structure in which use has been made of the exceptionally fine granite quarries of Northern Russia to produce monolithic columns of unexampled size; but there is little in the design to please the student of mere classic art. The porticoes are splendid because they could be closely copied from Roman examples, and their gigantic monolithic columns with gilt-bronze capitals suffice to give them splendor, but the design of the mass and the application of the cupola to it are of little value. A finer church is that of Our Lady of Kazan in Saint Petersburg, with a great portico where curved wings project on both sides, somewhat in imitation of the Piazza di San Pietro in Rome. Consult: Rikliter, *Monuments of Ancient Russian Architecture*, translated (1850); Souslow, *Monuments de l'ancienne architecture russe* (Leipzig, 1895-1901); Martinoff, *Anciens monuments des environs de Moscou* (Moscow, 1889); Montferrand, *Eglise cathédrale de Saint-Isaac* (Saint Petersburg, 1845).

RUSSIAN CHURCH. See GREEK CHURCH.

RUSSIAN LANGUAGE, THE. The most important of the Slavic languages (q.v.), with respect to the number of its speakers and its literature. It is spoken by about 90,000,000 people throughout the Russian Empire, and by about 4,000,000 Ruthenians in Galicia, Bukowina, and Hungary. It is also heard in Alaska. Though the language of a Bohemian sounds quite foreign to a Russian, yet the latter can, with a little effort, understand a Servian, a Bulgarian, or a Pole, and finds only a few difficult words and forms. In the tenth and eleventh centuries the difference was still slighter, yet even then Russian had a pronounced individuality and a number of well-defined dialects. The chief influence on Russian was exercised by the Slavonic of the ecclesiastical books, the contributions from the Tatar (quite few), Polish, German, and French being mainly limited to additions to the vocabulary. About the sixteenth century the Russian language reached its present state as far as the main features of it, in sound and form, are concerned. After Peter had introduced the present 'civil' alphabet, Lomonosoff (q.v.) gave the Russian its modern aspect by means of his many grammatical and philological works. At present, there are three distinct dialects of the Russian language:

(1) *Great Russian* found in its purest form about Moscow. This is the basis of literary Russian. It is used by about two-thirds of the Russian-speaking population, or about 60,000,000 people. Broadly speaking, it is heard in the north, centre, and east of Russia, having two subdivisions: (a) North Great Russian and (b) South Great Russian.

(2) *Little Russian*, spoken by about one-fourth of the Russian-speaking population, or over 20,000,000 people, in the south and southwest of Russia, and by the Ruthenians in Austria-Hungary. It possesses quite a literature of its own, the works of Shfchenko being its finest specimens, although in Russia the dialect is under official ban. It possesses three varieties: (a) North Little Russian, (b) South Little Russian, and (c) Red (Ruthenian) Russian (heard in Volhynia, Podolia, and Galicia).

(3) *White Russian*, spoken by about 5,000,000 people, in the western part of Russia, chiefly in Lithuania. The spelling is rather historical than phonetic, e.g. *поемŭ* (we sing) is pronounced *payóm* in the Moscow dialect, but a pronunciation more phonetic is quite common.

Among the formal characteristics of the Russian language may be noted: (1) Seven cases, nominative, genitive, dative, accusative, vocative, ablative (instrumental), and preposition-

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al: (2) three genders in nouns, adjectives, and past tenses of verbs; (3) two terminations for adjectives: (a) 'complete,' or purely adjectival, (b) 'clipped,' or predicative; (4) two varieties of participles: (a) adjectival and (b) adverbal (= Fr. gérondif); (5) only three tenses, but a great variety of 'aspects,' whereby a verb can be made to express the finest subtleties and shades of the Latin frequentatives, inchoatives, etc.; in general, through composition with a preposition, every present becomes a future, every imperfect a perfect: thus, e.g. *stoy-u* (= *sto*); *po-stoy-u* (= *stabo*); *stoy-al* (= *stabam*); *po-stoy-al* (= *steti*); (6) a great variety of diminutives and augmentatives; *syn* (son); *synishtche* (a strapping son); *syn-ok* (a little son); *syn-otchek* (a dear little son); *synishetchka* (a dear little mite of a son); and (7) finally, the disuse of the copula in the present tense, the absence of the article, and the personal endings of the verb, which allow the omission of the pronouns when desired for rhetorical purposes. The capacity for compounds and derivatives is so great that thousands of words belong to the same root. The arrangement of words is almost entirely free, as the grammatical inflexions obviate misunderstanding. This elasticity gives to the Russian tongue an incisiveness and perspicuity that most modern languages lack. On the other hand, the freedom of accent (there are Russian words with the accent on the seventh syllable from the end) and the variety of vowels from the *y* (broader than English *ĭ*) to *i* (softer than Italian *i*) allow of such a variety of cadences and poetic effects as are given only to several other modern languages combined. Thanks to these qualities, works of such varied character as the epics of Homer, the tragedies of Æschylus and Shakespeare, the sonnets of Petrarch, and the musical lyrics of Verlaine can be and have been translated into Russian with unsurpassable fidelity to the form and spirit of the originals.

The *Dictionary of the Church Slavonic and Russian Languages*, containing about 115,000 words, was published by the Second Section of the Imperial Academy of Sciences in 1847, but was very far from completeness. A new edition, the *Academic Dictionary of the Russian Language*, now in course of publication, embraces only nine or ten letters of the alphabet. The other standard work, V. Dahl's *Explanatory Dictionary of the Living Great Russian Language* (5th ed., Saint Petersburg, 1880-82), is the storehouse of current forms and expressions. The *Essay of a Provincial Great Russian Dictionary* (Saint Petersburg, 1852), with *Supplement* (1858), is of great value. The most important grammatical treatises are: Busslayeff, *Historical Grammar of the Russian Language* (5th ed., Moscow, 1881); Brandt, *Lectures on the Historical Grammar of the Russian Language* (vol. i., Saint Petersburg, 1892); Sobolevski, *Lectures on the History of the Russian Language* (2d ed., Saint Petersburg, 1891); and *The Old Church Slavic Tongue, Phonetics* (Moscow, 1891).

The best books for foreigners are: DICTIONARIES: Alexandroff, *Complete Russian-English* (3d ed., 1899), and *Complete English-Russian* (2d ed., 1897); Makaroff, *Dictionnaire Français-Russe* (7th ed., 1892), and *Russe-Français complet* (6th ed., 1893); Pavlovsky, *Russisch-Deutsches und Deutsch-Russisches Wörterbuch* (3d ed., Riga, 1886), a monumental work of its kind. GRAMMARS: Alexandroff, *A Practical Method of the Russian Language* (London, 1892); Riola, *How to Learn Russian* and *Key* (ib., 1878); Manassevitch, *Die Kunst die russische Sprache zu erlernen* (Vienna, Pest, Leipzig); Abich, *Die Hauptschwierigkeiten der russischen Sprache* (Leipzig, 1897); and Körner, *Ausführliches Lehrbuch der russischen Sprache* (Sondershausen, 1892).

RUSSIAN LITERATURE. The literature of Russia presents an interesting phenomenon by the side of the other European literatures. Although it possesses a remarkable wealth of genuine folk-poetry, both epic and lyric, Russian written literature developed independently of the purely national literature, and, with the exception of the famous *Song of Igor's Band* in the twelfth century (see IGOR'S BAND, SONG OF), until modern times there was no artistic work on these national themes. For practical purposes Russian literature may be divided into four periods:

(1) PERIOD OF BYZANTINE GREEK INFLUENCE. As in many other countries, the beginnings of literature are found in translations from Old Church Slavic (q.v.) of the Bible and books for church service. Even when copying the Old Church Slavic books of worship, the scribes frequently modified the original texts to Russian, most often inadvertently, but also sometimes purposely to make the text more intelligible to Russian readers. Thus drawing upon Greek models, the Russians gradually came to write also independently. The most original writers of this period are Ilarion, the first Russian Metropolitan (1051-54), and Kyril Turovski, both representatives of genuine oratory; Daniel the Exile (thirteenth century), whose *Prayer* was intended to soften the heart of Yaroslaff Vsyevoloditch, who imprisoned him on Lake Lache; the Abbot Daniel, whose *Journey* to Jerusalem (1106-08) is important for its topographical information concerning Palestine, and as throwing some light on the subsequent final schism of the Greek and Roman Catholic Church; and finally Nestor (q.v.), the author of the *Chronicle*. Furthermore, almost every principality of any account had its annalist, so that numerous chronicles are extant. Mention must also be made of Yaroslaff's Code, *Russian Right* (1054), and of Prince Vladimir Monomakh's (1113-25) *Precepts to My Children*, a vade mecum of practical advice reinforced by examples drawn from his own life.

(2) PERIOD OF DARKNESS AND STAGNATION (from the thirteenth to the seventeenth century inclusive). The Tatar invasion under Batiy (1224-1237) almost annihilated Russian literature. However, a few works of some merit belonging to this period have been preserved. Chief among these are the *Journeys* of Antony, Archbishop of Novgorod, to Constantinople (1200); of the monk Simeon and the Susdal Bishop Avraamiy, who accompanied the Moscow Metropolitan Isidor to the Florentine Council (1439); and of Afanasiy Nikitin, a merchant of Tver who journeyed to India (1466-72). Then follow the Apocryphal Tales about Solomon, taken from the Greek Chronographs and Palæas, and the famous battle on the field of Kulikovo (1380), where the Tatars were routed, moved an unknown author to write *Zadonshtchina*, "Events

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Beyond the Don," a rehashing of an earlier work, with senseless additions from the *Song of Igor's Band*. On the fall of the South Slavic monarchies in the fourteenth century, the scholars of the south began to migrate into Russia. For almost two centuries there was, however, practically no revival of literature. At a council held at Moscow in 1557 at the command of Ivan IV., the first Czar of Russia, it was enacted that only revised books were henceforth to be used in the church. As no one in Russia was capable of undertaking the task of redaction, Maxim the Greek (1480-1556) was intrusted with the work. Perhaps the most important monument of this period is the famous *Domostroy*, "Household Regulation," of the priest Sylvester, adviser of Ivan IV. (1547-1560). Written for his son, it comprises a mass of regulations concerning every phase of life, from questions of morality and religion to the minutest details of cuisine. The polemic of five letters from Prince Kurbski (1528-87) in Poland to Ivan is remarkable for the literary contrast between the style of the learned and gifted Kurbski and that of the Czar, equally gifted, biting, and well read, though possessing no systematic education. His other work, a *History of the Muscovite Czar*, is a logical, though partisan, recital of the development of Ivan the Terrible's character. The seventeenth century brought with it new ideals, and the writers of that century, Yuri Krizhanitch, the Servian, in his *Polity*, and Grigori Kotoshikhin (1630-67), in his *Russia in the Reign of Alexei Mikhailovitch*, appeal for education, the greatest need of the young State. Other important literary events of Alexei's reign (1645-76) were the establishment and publication of the first Russian newspaper, although in manuscript form, and the foundation of the theatre at Moscow.

(3) Period of Western European Influence (eighteenth century). The connection between Russia, wrapped up in her Greek orthodox faith, and Western Europe was very slight during the Tatar domination. Only after the return of Peter the Great in 1698 did Russia become again a European State, and her literature more or less a replica of the theories and views current in Western Europe. Peter's reforms encompassed even the simplification of the alphabet in conformity with Roman characters; new words were introduced, constructions were modeled upon the French and German, and liberal rewards were paid for translations of useful books into Russian. In his labors the Czar was assisted by the Bishop Feofan Prokopovitch, an erudite writer and man of great political sagacity. Kantemir (q.v.), an ambassador in Western Europe, with his satires represents a great step forward. They were the first germ of modern Russian realism. Tredyakovski (1703-69), through a study of the Russian national poetry, discovered its tonic metre, though his verse was clumsy. The great name of Russian literature in the eighteenth century is Lomonosoff (1711-65). His works on rhetoric, grammar, and versification laid the permanent basis of modern Russian literature by limiting the use of Old Church Slavic forms in literary language. His contemporary, Sumarokoff (1718-77), established the pseudo-classical tragedy, with his dramas written in servile imitation of Corneille, Racine, and Voltaire. But the real elements of progress for Russian letters lay in his comedies and fables and satires, where much genuine native wit and humor is displayed. His greater successor, Fonvizin (1745-92), wrote two comedies, *The Brigadier* and *Nyedorosl*, "The Minor," in which he ridiculed the deeply rooted ignorance that lay concealed under the thin veneer of education obtained from foreign tutors. The reign of Catharine II. found a spirited panegyrist in Derzhavin (q.v.), whose lyrics and odes are characterized by strong imagery and vigorously plastic form. The Academy established at Saint Petersburg (1726) and the first Russian university at Moscow (1755) produced a number of native scholars. A taste for literature, intensified by the vogue of Bogdanovitch's *Dushenka*, was growing up. The opportunity was seized by Novikoff (1744-1818), a man of letters and a publisher of popular literary magazines.

The end of the century witnessed the rise of sentimentalism in Russia, as in the rest of Europe. This movement found immediate response in Russia. Here belongs the work of Karamzin (q.v.). His short stories, imitations of 'family novels,' and his *Letters of a Russian Traveler*, modeled after Sterne's *Sentimental Journey*, created a demand for literature, and his *History* was an event in Russian letters.

(4) The Nineteenth Century Romanticism. In Russia the romantic movement found representatives in Zhukovski (1783-1852), a gifted poet, famous for his remarkable translations of Goethe, Schiller, Byron, Tasso, and Homer (*Odyssey*), and Batyushkoff (1787-1855), who worked in similar fields. The exclusive domination of French models in Russian literature was broken. The Russian verse as perfected by Zhukovski and Batyushkoff was awaiting a great master to take advantage of its technical perfection for original work. That master was Pushkin (q.v.) (1799-1837). His epic *Ruslan and Lyudmila* (1820) was the first successful attempt to draw material from Russian antiquity and popular legends. He sounded genuine national notes in his drama *Boris Godunoff* (1825), written under the influence of Shakespeare, and in his *Yevgen Onyegin* (1825-32). After Pushkin Russian literature becomes an independent branch of European literature. Besides the circle of his literary disciples and colleagues, like Ryleyeff, Baratynski, Prince Odoyevski, Prince Vyazemski, Bestuzheff, and others, two great names are prominent—Lermontoff (1814-41) and Koltsoff (1808-42). Lermontoff, strongly tinged with Byronism, was Pushkin's direct disciple, but his individuality marks him as an independent poet, second only to his teacher. In his novel, *A Hero of Our Time*, he produced a masterpiece fully equal to Pushkin's *Yevgen Onyegin*. Koltsoff created the art-song, all the motives and themes being those of the people, and invested it with perfect artistic form. Gribyedoff's (1795-1829) remarkable comedy-satire, *The Misfortune of Being Too Clever*, ridiculed society for aping the fads and fashions of Europe and disdaining the old native simplicity. Another great poet was the fabulist Kryloff (q.v.) (1768-1846), who cast into the shade his predecessors Khenimtser (1745-1784), Dmitriyeff (1760-1837), and Sumarokoff. Though he wrote much in other lines, his fame rests on his fables, which are

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among the best of their kind in the whole range of literature.

THE PERIOD OF NATURALISM IN RUSSIAN LITERATURE. The first prose-writer in Russia to give the novel the important position it now enjoys in literature was Gogol (q.v.) (1809-52), Pushkin's devoted admirer and friend. In his comedy *Revizor* and his unfinished novel *Dead Souls*, he brought to the front the humorous side of Russian officialdom, which he held up to ridicule with amazing power. This period marks an epoch in the history of Russian literature.

SLAVOPHILS AND WESTERNERS. Both parties saw in Russia the 'elect nation,' the future regenerator. But the Slavophils found that regenerative force in Russia's past with her historical traditions, while the Westerners saw the special fitness of Russia to play the rôle of universal regenerator in the very absence of historical traditions. However great the differences in their political views, both camps were inspired by the same sincere love for the people, in whom alone they saw the future of Russia, for whom alone they pursued their labor of love and life. In this literary war the Westerners had the advantage of literary and artistic superiority. Around the coterie of Herzen, Bakunin, Byelinski, Stankyevitch, and Granovski clustered a number of rising authors, with higher education, all eagerly listening to their prophet, Byelinski. Turgenieff, Tolstoy, Dostoyevski, Grigorovitch, Gontcharoff, Shtchedrin, Sheftchenko, Nekrasoff, and even Gogol, more or less, were products of Byelinski's school, whose tenets were the attainment of the social and ethical ideals of society. This school laid the foundation of the Liberal Russian movements.

EPOCH OF GREAT REFORMS (1855-62). On the accession of Alexander II. the writers who had been exiled for their reformatory endeavors were allowed to return to the capital. The periodicals tried to revive the liberal ideas of Byelinski, apparently forgotten since his death. Two great critics were molding public opinion, and directing it in the line of reform: Tchernyshevski (q.v.) (1828-89), choosing his themes in connection with the questions of the day, established positivist principles instead of the misty Hegelianism of the forties. His pupil and successor, Dobrolyuboff (1836-61), a progressist *par excellence*, introduced criticism of public affairs into Russian literature. A literary production was henceforth esteemed in proportion as it advocated social progress. Aksakoff's *Chronicle;* Turgenieff's *Rudin, Noblemen's Nest, On the Eve, Fathers and Sons;* Gontcharoff's *Oblomoff;* Ostrovski's *Storm;* Shtchedrin's *Governmental Sketches;* Pisemski's *Thousand Souls* and *Bitter Lot;* Dostoyevski's *Memoirs from a Dead House;* Tolstoy's *Sebastopol Tales;* and A. Tolstoy's *Trilogy*—all these were created during the first years of this period of intensity in literature.

REACTION AND THE EPOCH OF NIHILISM. The peasant riots of 1862-63, on the morrow of liberation, the disturbances among the students, and especially the Polish insurrection of 1862-63, gave the reactionaries in the Slavophil camp an opportunity long awaited. The cry of nihilism went up, and Katkoff, a Slavophil constitutionalist, now became the leader of Slavophilism in its new spirit of devotion to absolutism and throne, and advocacy of Russia for the Russians. Herzen and the 'nihilists' were pointed at as the only causes of the disturbances, and restrictions were loudly demanded. The liberal writers transferred their dissatisfaction to their works of art. Shtchedrin was unmerciful with his satire; Turgenieff pleaded in his pessimistic vein; Dostoyevski and Pisemski openly went over to the side of the reactionaries; Gontcharoff was at all events not in sympathy with the liberals. On the other hand, Katkoff's *Russian Messenger* and *Moscow Gazette* were stocked with 'anti-nihilistic' fiction; Pisemski's *Turbulent Sea*, Klyushnikoff's *Mirage*, a series of novels by Lyeskoff and Vsyevolod-Krestovski, depicted nihilists as the very dregs of society.

Simultaneously, interest in the peasants created the 'muzhik literature' so prominent in the next decade. The comic sketches of the peasants by N. Uspenski and Slyeptsoff (in the fifties) were succeeded by the serious sociological studies of Ryeshetnikoff, Levitoff, and Naumoff. Yakushkin spent all his life wandering over Russia, bundle in hand, collecting tales and songs. Commissioned by the Government, Maksimoff traversed Siberia and embodied his observations in the famous *A Year in the North*. Together with Danilevski's studies of South Russian peasant life and Melnikoff's studies of the life of the Raskolniks, these gave a true conception of the life of the lower classes.

THE SEVENTIES—'PEASANTISM.' The interest in social sciences expounded by the brilliant sociologist and critic Mikhailovski was at its height; his path was prepared by Pisareff (1841-68), who had established utilitarianism and real notions of individual rights in Russia. The liberals came to the conclusion that the only way to help the people was to enter among them and there spread knowledge and enlightenment. Thousands of young people donned the peasant's garb, foregoing the comforts of culture and city life. The period was not favorable to new names—altruistic action consumed the flower of the generation—but the old talents developed to the highest point. Shtchedrin wrote his *Messieurs Goloveyeff* (the crowning work of his literary career). Tolstoy, too, turned to altruistic love in his 'famine letter' (1873) and *Anna Karenina*. All the new literary talents directed their efforts to *muzhik* fiction. Among these writers the names of Glyeb Uspenski and Zlatovratski stand out in bold relief. Toward the end of the seventies pessimistic views begin to be reflected in the new authors. Such were Novodvorski, Yasinski, Petropavlovski, Ertel, and particularly Garshin. However, in others, notably Potapenko and Korolenko, an optimistic note is heard.

THE EIGHTIES AND NINETIES (EPOCH OF GROPING FOR NEW IDEALS). Alexander III. instituted on his accession in 1881 a system of rigor and reprisals. In literature only 'pure art' and productions incriminating the 'underminers of the foundations' were left undisturbed. A new school, ultra-Chauvinist and of the boulevardier-type, cropped up. Katkoff is the great leader of the absolutist party; another is Prince Meshtcherski, editor of the *Citizen*. Nearly all liberal publications were stopped. Only Boborykin constantly embodied the latest questions of the day in his numerous novels. Fiction was forced into new channels, where discussions of current life is impossible; the historical novel flourishes under Vsyevolod Solovyoff, Mordovtseff, and Danilevski. In poetry the most popular name is that

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of Nadson (1862-87), whose themes are the sorrows of his own life. Poets like Minsky, Fofanoff, Mereshkovski, Balmont, Andreyevski, turned into Decadents and Symbolists. Among the champions of liberal thought most prominent is the philosopher, critic, and poet Vladimir Solovyoff (1853-1900). Another foe of obscurantism is Menshikoff, a follower and personal friend of Tolstoy.

At present Russian thought turns to the discussion of material problems, the strides of capitalism being vigorously combated on sociological grounds by Mikhailovski. Gorky (q.v.) (pseudonym of A. Pyeshkoff) depicts the life of the lowest scums of city life, paupers, and vagabonds. Other prominent names among writers of this class are Tchekhoff and Melshin (pseudonym of P. Yakubovitch), the latter of whom had spent a dozen years in Siberian exile. Melshin's *From the World of Outcasts*, describing prison life as he saw it, has been unanimously assigned a place of honor by the side of Dostoyevski's *Memoirs from a Dead House*, while his poems mark him as the most eminent poet-thinker of Russia at present.

FOLK-LORE. Probably no other nation possesses a more remarkable wealth of folk-lore than Russia. The proverbs and the riddles run into the thousands, the best collections being those of Dahl, *Proverbs of the Russian People* (new ed., Saint Petersburg, 1879), and Ladovnikoff, *Riddles of the Russian People* (ib., 1876). There are several collections of fairy-tales, the most satisfactory being that of Afanasyeff, *Russian Popular Tales* (3d ed., Moscow, 1897). There are ritual songs and incantations for every event of life from birth to burial. The lyric songs mirror the whole of the Russian character. Those of Northern Russia are characterized by native strength; those of the south are graceful, delicate, and plaintive. The latest work on the subject is by Lobolevski, *Great Russian Folk-Songs* (7 vols., Saint Petersburg, 1895 et seq.). The epic songs or *bylinas* (q.v.) date from legendary times to the nineteenth century, but those dealing with the past are the best. These have appeared in collections by Kireyevski (10 vols., Saint Petersburg, 1860-74), Rybnikoff (4 vols., Petrozavodsk, 1861-67), Hilferding (Saint Petersburg, 1873), and Avenarius (5th ed., Moscow, 1898).

Consult: Rambaud, *La Russie épique* (Paris, 1876); Ralston, *The Songs of the Russian People* (London, 1872); id., *Russian Folk-Tales* (ib., 1873); Hapgood, *Epic Songs of Russia* (New York, 1887); Wolkonsky, *Pictures of Russian History and Russian Literature* (Boston, 1898); Bazân, *Russia, Its People and Its Literature* (Chicago, 1890); Turner, *Studies in Russian Literature* (London, 1892); id., *Modern Novelists of Russia* (ib., 1890); Waliszewski, *History of Russian Literature* (New York, 1900); Wiener, *Anthology of Russian Literature* (ib., 1903); Reinholdt, *Geschichte der russischen Litteratur* (Leipzig, 1886); Léger, *La littérature russe* (Paris, 1892); De Vogüé, *Le roman russe* (4th ed., ib., 1897); Dupuy, *Les grands maîtres de la littérature russe au XIXième siècle* (ib., 1885).

RUSSIAN MUSIC. See SLAVONIC MUSIC.

RUSSIAN TURKESTAN. See TURKESTAN.

RUSSNIAKS. See RUTHENIANS.

RUSSO-JAPANESE WAR (1904-05). The causes of the war lay in the irreconcilable differences between the two nations involved, as brought about by their aggressive policy in the Far East. In 1895, when Japan, after its decisive triumph over China, had obtained from that power the cession of the Liao-tung peninsula, the Czar's government, supported by France and Germany, compelled the Japanese to retrocede to China the coveted foothold on the Asiatic mainland. Three years later Russia obtained the lease of the Liao-tung peninsula for a period of twenty-five years and Port Arthur was made the chief naval base of Russia in the Far East. Natural resentment at being deprived of the fruits of victory may have given rise to a desire for war with Russia among a large section of the Japanese nation; the occupation of Port Arthur and the events that followed constituted an actual menace to Japanese interests. As a result of the Boxer uprising of 1900 (see CHINESE EMPIRE), Russia obtained control of Manchuria, and in spite of repeated treaty stipulations showed no desire to abandon its hold. This attack on the integrity of China was met by the conclusion of the Anglo-Japanese alliance of 1902 (see JAPAN), in which the two contracting powers pledged themselves to the maintenance of the integrity and independence of China and Korea. The latter empire Japan regarded as its peculiar sphere of interest. The Anglo-Japanese alliance undoubtedly furthered the approach of war between Japan and Russia.

The final crisis began in May, 1903, when a Russian settlement was established at Yon-gam-pho, on the Korean bank of the Lower Yalu, for the ostensible object of carrying on timbering operations in accordance with concessions obtained from the Korean government in 1896. To prevent the establishment of Russian predominance in that section the Japanese government, supported by the United States and Great Britain, demanded of the Korean government the opening of Yon-gam-pho and Wi-ju to foreign trade. Delays ensued. In July the Japanese government entered into negotiations with Russia, looking towards the fulfilment by the latter of its treaty obligations with regard to Manchuria and a delimitation of the respective spheres of influence of the two powers. The Japanese proposals as submitted on August 12 included a mutual guarantee of the independence and integrity of China and Korea and of the maintenance of the principle of equal opportunity for all nations; the recognition of the predominant interests of Japan and Russia in Korea and Manchuria respectively; a pledge by Russia to permit the extension of the Korean railway into Manchuria; and, finally, recognition by Russia of the exclusive right of Japan to offer advice in the reform of Korean administration. The reply of the Russian government was received early in October. It conceded the special position of Japan in Korea, but called for the creation of a neutral zone in that empire north of the line of 40° within which military activity should not be permitted, and the recognition by Japan of Manchuria as in all respects outside of its sphere of interest.

The Russian proposals were rejected by the Japanese government which, on October 30, presented a series of modified demands. Public feeling in Japan was at a white heat and on December 1 the ministry requested the favor of a

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speedy reply. The Russian answer which came on December 11 consisted of a restatement of the earlier note, with the omission of the clause regarding Manchuria. On December 21 the Japanese government wrote that to exclude Manchuria from discussion would nullify one of the objects of the current negotiations which aimed at the protection of Japanese interests in that part of China; further, that the establishment of a neutral zone in Korea was inadmissible unless a similar zone was established on the Manchurian side of the frontier. The Russian note of January 6, 1904, extended a promise to the effect that no measures would be taken to impede the exercise by Japan of rights in Manchuria secured by treaty with China, but insisted on the recognition by Japan of Manchuria as outside its sphere of interest as well as upon the neutral zone in Korea. On January 13 the Japanese government submitted its final proposals. It consented to recognize Manchuria as outside its sphere of interest, provided Russia made a similar declaration with regard to Korea, but persisted in rejecting the neutral zone. On January 23, 26, 28, and 30 the Japanese government urged upon St. Petersburg the necessity of a prompt reply, but none was forthcoming. Active preparations for war had been going on in both countries for many months, and Japan interpreted the dilatory tactics of the Russian government as designed to gain time for the rushing of reinforcements to the Far East. On February 6 the Japanese minister at St. Petersburg informed the Russian foreign office of his government's decision to sever diplomatic relations and to take such independent action as it thought fit. The formal declaration of war by Japan did not come until February 10, after the beginning of hostilities.

Naval Operations.

In order to make it possible for Japanese troops to be safely transported to the seat of war, and supplied, it was necessary that the Russian fleet be destroyed, blockaded, or neutralized. But in the prosecution of this design sight was never lost of the fact that Russia had an available fleet at home greater than the whole Japanese navy, and that the defeat of the Russian forces in the East ought, if possible, to be obtained without crippling the Japanese fleet to such an extent that it would have no reasonable hope of making headway against the reinforcements which the enemy might send out from Europe. This was essential because Japan had her whole naval force engaged, and no great losses could be supplied during the continuance of the war. Such conditions required quick and careful work by the fleet of Admiral Togo (q.v.), which consisted of six battleships of 12,500 to 15,200 tons; eight armored cruisers of 7,600 to 9.800 tons; a number of coast defense vessels, cruisers, and gunboats, and five divisions of torpedo boats and destroyers. The torpedo craft were pushed forward from the start; these were small and could be replaced. But in all the operations preceding the battle of the Sea of Japan the heavy ships were exposed to serious injury only when the greatest gain was to be expected. The ranges—even at the final great battle—were long. Admiral Togo struck his first blow on the night of February 8-9, 1904, sending three of his torpedo divisions. The Russian ships were lying outside of Port Arthur in an apparent state of fancied security when the boats reached them. The battleships *Czarevitch* and *Retvisan*, and the large cruiser *Pallada* were seriously injured, but not beyond rapid repair. Nevertheless, the Russian fleet was so far weakened that it could not take the sea in full force, and the transport of Japanese troops was assured. As the Russian ships retired to the inner harbor of Port Arthur, Togo was uncertain as to the extent of injuries inflicted, and shelled the anchorage at long range with his large ships, hoping to effect further damage. He was partly successful, and the *Poltava, Diana, Askold, and Novik* were hit, but in return his ships sustained some slight damage from the fire of the forts. The Russians proceeded energetically to repair injuries,—the *Novik* being completed on February 21; the *Pallada* about the middle of April; and the *Czarevitch* and *Retvisan* between the 15th and 20th of June.

While these operations were in progress the first fleet of transports, convoyed by Admiral Uriu, had reached Che-mul-po, the port of the Korean capital, on February 8. The Russian cruiser *Variag* (6500 tons) and gunboat *Korietz* (1400 tons) had been in this port for some time. The lighter Japanese vessels of the fleet surrounded the Russians as they lay at anchor and a fight seemed imminent, but was averted by the protests of neutral warships, the Japanese agreeing to make no attack if the Russians did not interfere with the landing of the Japanese troops. The landing was completed about midnight. The next morning Uriu informed the captain of the *Variag* that he would be attacked at the anchorage at 4 P.M. unless he left it. The Russian vessels thereupon got under way about 11.45 A.M. and started down the channel toward the enemy, who lay in wait about eight miles below Che-mul-po. The Russians opened fire at about 6000 yards, and the range during the fight seldom fell below 5000. The Russian ships were plainly overmatched and soon retreated to the anchorage, though they had so far sustained comparatively little injury—the *Korietz* none at all. By direction of the senior officer, the *Korietz* was blown up at 4.30, and the *Variag* and the Russian steamer *Sungari* sunk.

On February 11 the Russian mine-laying steamer *Yenisei* was blown up near Dalny by one of the mines she was laying; she had previously placed 400 without accident. On February 12 the Russian protected cruiser *Boyarin* (3200 tons) ran ashore at Dalny and became a total wreck. On the night of February 13 the Japanese destroyers attacked the ships at Port Arthur but effected no actual damage. Four days later Vice-Admiral Makaroff was appointed Commander-in-Chief in place of Vice-Admiral Starck, who returned to St. Petersburg. The paramount necessity of preventing interruption of the line of communications impelled the Japanese to unremitting efforts to destroy or blockade the Port Arthur fleet. The condition of the injured ships was unknown, and as an attempt at bombardment was quite as likely to result in loss to his own as to the Russian fleet. Admiral Togo decided to attempt to close the harbor by sinking vessels in the entrance. Both this and later attempts of the same sort were failures. So far as observed, the sunken wrecks did not materially obstruct the channels. In order to do everything possible to insure the safety of the transports, Admiral

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Kamimura with the armored cruiser squadron was sent to shell Vladivostok and, if possible, injure the navy yard or the Russian vessels there. He carried out his orders, but no damage of any sort was effected.

On March 8 Vice-Admiral Makaroff (q.v.) arrived and assumed command. On March 10 the Japanese destroyer flotilla ran inshore and laid down mines. While on their way out they encountered the Russian destroyers, captured one (which sank shortly afterwards) and caused the rest to retreat. Admiral Makaroff with two cruisers went out to the support of his destroyers, but arrived too late and was soon driven in by the blockaders. While waiting for the completion of repairs on the battleships, Admiral Makaroff made several sorties with what vessels he could muster, but always kept near enough to port to be able to reach the protection of the fortifications should the Japanese appear in too great force.

On the night of April 11–12 the Japanese sent in a mining transport and placed a considerable number of mines, but they did not close the channels, and it is thought that many broke adrift and afterwards destroyed both friend and foe. Early on April 13 Admiral Makaroff put to sea with the battleships *Petropavlovsk* (flagship 11,000 tons), *Pobieda* (12,670 tons) and *Poltava* (11,000 tons), and four cruisers. He passed through the recently laid mine field and drove the Japanese cruiser squadron to seaward for about 15 miles, when they were reinforced by the first or principal squadron and some other vessels. Seeing the force opposed to him too great to give any prospect of successful action, Makaroff retired towards port. When about one and three-quarters miles from the mouth of the harbor the *Petropavlovsk* was seen to heel over suddenly and sink in two minutes, her hull being enveloped in a white smoke following the noise of a tremendous explosion. The Russians reported that she had struck a line of floating mines, which exploded on contact. Admiral Makaroff, the celebrated painter Verestchagin, and 550 officers and men went down with the ship; about 85 were picked up.

During the month of May the Japanese lost the *Miyako* (cruiser, 1800 tons — sunk), *Yoshino* (cruiser, 4180 tons — sunk in collision), *Hatsuse* (first class battleship, 15,000 tons—sunk by floating mines), *Yashima* (first class battleship, 12,500 tons — sunk by floating mines). On July 5 the *Kaimon* (gunboat, 1360 tons), on September 3 the *Saiyen* (cruiser, 2320 tons), and on September 18 the *Haiyen* (coast defense ship, 2000 tons) were sunk by striking mines. The sinking of the *Hatsuse* and *Yashima* made a most serious reduction in the strength of the Japanese fleet, and but for the death of Admiral Makaroff and the loss of the *Petropavlovsk* the subsequent events might have been very different.

During April, May, and June the Vladivostok squadron, consisting of the armored cruisers *Gromoboi* (12,300 tons), *Rossia* (12,200 tons), and *Rurik* (10,900 tons) made raids to the southward, destroying several Japanese transports and neutral vessels with contraband of war. On June 23 Admiral Vithöft, who succeeded Admiral Makaroff in command of the Port Arthur fleet, put to sea with the repaired battleships and the others—six in all. After a running fight Vithöft returned and anchored under the guns of the fortifications. No serious injuries were inflicted by either side, but when nearly back to the anchorage the *Sebastopol* struck a mine which damaged her so seriously that it took six weeks to effect repairs. On August 10 the repairs to the *Sebastopol* having been completed, Vithöft again went out with his entire force,—six battleships (*Czarevitch*, flagship), two large cruisers, the *Novik* (cruiser, 3100 tons), two torpedo boat divisions and two gunboats. The Japanese were met in full force and a long range fight lasted all the afternoon, with an interval of about two hours, when the evolutions of the combatants separated them. Up to 6 o'clock no very decided advantage was gained by either side, but about 6.15 a 12-inch shell burst near the conning tower of the *Czarevitch*, killing Admiral Vithöft and wounding the captain of the ship. At the same time the *Czarevitch's* steering gear was injured, the helm jammed, and she made a rank sheer to port. This and the death of the Admiral threw the Russians into confusion. Rear-Admiral Prince Uktomsky, in the *Peresviet*, now took command, but owing to injuries to the masts the ordinary means of signalling were unavailable, and the Russian ships remained for some time in a confused group, upon which the Japanese directed a hot fire at the comparatively short range of 3500 yards. This state of affairs continued until the admiral was able to signal "Follow me." The cruiser *Pallada* and all of the battleships except the *Czarevitch* then returned to Port Arthur more or less independently, owing to the darkness and repeated attacks by the enemy. The Japanese did not continue the pursuit very far. The *Czarevitch* beat off torpedo attacks and, notwithstanding she was reduced to an average speed of about four knots, she escaped to the German port of Kiauchau, where she was interned. The *Askold* escaped to Shanghai, where she too was interned. The *Novik* went to Kiauchau, but left after a few hours. The ships which retired to Port Arthur remained there inactive until destroyed just before the surrender.

On the same day that the Port Arthur fleet put to sea the Vladivostok squadron left port, and it is fair to suppose that a junction of the two forces was intended. About 4 A.M. on August 14 it was sighted off Ulsan, Korea, by Admiral Kamimura, who had with him four armored cruisers and the armored cruiser squadron of Admiral Uriu. The Russians turned to the northward, making for Vladivostok, and were followed by the enemy. The *Rurik* was the rear ship and the Japanese fire was chiefly directed against her at ranges of 4500 to 5500 yards. About 8 A.M. an 8-inch shell disabled her steering gear and the tiller jammed. When she began to fall behind, Kamimura left her to the tender mercies of the armored cruisers, and pushed ahead after the other two. A long running fight ensued, in which the Russians suffered severely, having 616 killed and wounded, and the Japanese 114, of which 75 were on the *Iwate*. Eventually the *Gromoboi* and *Rossia* escaped, but the *Rurik* was rendered helpless by the disabling of both guns and steering mechanism, and was sunk by her own people.

It is difficult to understand Russia's folly in bringing on war with a naval force in the East inferior to the force Japan could bring against it, while in Russian dock yards were five battleships of the latest type almost complete

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and two more were well advanced in construction. However, the mistake having occurred, the greatest efforts were made to rectify the shortcomings. Four of the battleships in the Baltic yards were hastily fitted out, and, together with a miscellaneous assortment of old vessels, were formed into a new fleet to be at once dispatched to the seat of war. The lack of officers and men was so great that it is said that many were transferred from the army to fill the vacancies. On October 15 the Russian Baltic fleet under the command of Admiral Rozhestvensky (q.v.) left Libau. Six days later the vessels showed their state of discipline and preparedness by firing into each other and at English fishing boats on the Dogger bank, whose position and presence they should have fully expected. The condition of his ships' companies was probably appreciated in full by the commander-in-chief, and that knowledge was doubtless one of the principal causes of his delay in reaching the seat of war. After leaving the harbor of Vigo in Spain the fleet separated into two divisions, part under Admiral Folkersam proceeding through the Mediterranean Sea and the Suez Canal, while the second division under Admiral Rozhestvensky took the longer route around the Cape. The fleet reunited in Madagascar waters early in January, 1905, and proceeded to lay in provisions and coal. The action of the French government in permitting the Russian fleet to make use of French ports in violation of generally accepted principles with regard to the conduct of neutrals aroused great resentment in Japan. In the middle of March the Russian fleet left Madagascar and on April 12 it arrived at Kamranh Bay in French Indo-China, where it proceeded as at Madagascar to supply its needs from French sources. On this occasion the Japanese government made formal protest in consequence of which the Russian fleet left Kamranh Bay towards the end of April but only to continue preparatory operations in French waters at Hon-Kohe. There on May 16, Rozhestvensky was joined by a squadron under Admiral Nebogatoff which had left the Baltic in February. As the integral Russian fleet moved forward to the north it consisted of 8 battleships, 9 cruisers, 7 destroyers, with a number of coast defense and special service ships comprising thirty-five vessels in all. Vladivostok, the Russian objective, might be reached either through the Korea Straits and the Sea of Japan, or by the more northern route along the east coast of Japan and through the straits of Tsugari or La Pérouse. Admiral Rozhestvensky chose the southern course and his action had been anticipated by the Japanese admiral.

Near Tsushima Rozhestvensky came upon the enemy. His fleet was formed in two columns, the battleships to the eastward, for from this direction he expected attack. Instead, it came from the west. The general unpreparedness of the Russians showed at once. Instead of immediately changing flanks and forming column of the fighting ships, the whole force faltered and only formed in proper battle order when too late. This enabled Togo to crush the leading ships *seriatim* without receiving much damage in return. Indeed, considering the unfavorable positions in which the Russian ships were placed, it is surprising that their fire accomplished so much as it did. The battle was decided in the first hour, though it was not until the evening of the next day (May 28) that the last Russian ship was sunk, captured, or forced to flee. The fight was won by gun fire and tactics; the torpedo and the torpedo boat cut a most subordinate figure. The Russian losses comprised in ships sunk, 6 battleships, 4 cruisers, 1 coast defense ship, 5 special service ships, and 5 destroyers; captured, 2 battleships, 2 coast defense ships, and 1 destroyer; killed, about 4000, prisoners, over 7000. Only one cruiser and one destroyer succeeded in reaching Vladivostok. Six ships, including three cruisers, fled and were interned at Manila and Shanghai. The Japanese reported the loss of three destroyers, 116 killed, and 538 wounded. The Battle of the Sea of Japan, which swept away Russia's last battleship, very naturally ended the naval war and left Japan mistress of the Eastern seas.

Military Operations.

Detailed information as to the nature of the terrain on which the war was fought is to be found under Manchuria (q.v.), in addition to that supplied by the map accompanying the present article. Here it will be sufficient to point out only a few general facts of topography and distance. The scene of hostilities was southern Manchuria, stretching for about 250 miles from Tie pass on the north of Mukden to Port Arthur at the southern extremity of the Kwan-tung peninsula, and about 130 miles east and west, from the valley of the Yalu to the valley of the Liao. Intersecting this rough rectangle from northeast to southwest is the great backbone of the Shan-a-lin or Long White Mountains, pierced by numerous passes. To anticipate the detailed account of the movements of the armies, it may be stated here that the conflict began in the southeastern corner of the region between the Yalu and the Liao; that it receded with the progress of the Japanese armies northwestward across the mountains into the valley of the Liao, and that the decisive battles of the campaign were fought with the hostile armies facing each other north and south, having their western wings in the plain and their eastern wings in the mountains. Port Arthur by air line is more than 4000 miles from St. Petersburg and about 750 miles from Tokio and if the actual length of the ways of communication be considered, the disparity of distance separating the combatants from their ultimate base appears still greater, Port Arthur being nearly 5800 miles by rail from St. Petersburg, and less than 400 miles from the Japanese port of Saseho. The Japanese line of communication was the sea, mastery of which was obtained by the opening blows of the war at Port Arthur and Che-mul-po (see Naval Operations above). The Russian armies were strengthened and fed by the Trans-Siberian railway, a single-track line which in spite of general predictions to the contrary responded admirably to the strain put upon it.

Through the Battle of the Yalu. On February 8, 1904, the first Japanese army under the command of General Kuroki (q.v.) began disembarkation at the Korean port of Che-mul-po, under the protection of a Japanese squadron under Admiral Uriu. Towards the end of February there were about 30,000 Japanese troops in Seoul, and on the 23d the Korean emperor was forced to enter into a treaty of friendship and alliance with Japan. From Seoul the Japa-

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nese advanced towards the Yalu River with 45,000 or 50,000 men. On March 28 a small force of Kossacks was routed at Cheng-ju, and on April 7 Wi-ju, on the Korean shore of the Yalu, was occupied. The strength of the Russians in the Far East on the outbreak of hostilities has been estimated at about 130,000, distributed between the fortresses of Vladivostok and Port Arthur and along the railway from these points to Harbin, on the Tiumen River, constituting the northern frontier of Korea, and in the region west of the lower Yalu. Of the 50,000 troops more or less in the last category, under the command of General Kuropatkin (q.v.) who in February had been appointed to the chief command of the Russian armies in the Far East, about 15,000 or 20,000 men under General Zassulitch were charged with the task of holding the line of the Yalu against the Japanese. Outnumbered three to one, the Russian commander added to his difficulties by scattering his troops over a distance of nearly fifteen miles, stretching from the mouth of the Yalu, northward through his main position at Kiu-lien-cheng. The reserves as it turned out were held too far in the rear.

The channel of the Yalu near Wi-ju is cut by a chain of islands into three streams. On April 26 the Japanese began to throw bridges from Wi-ju to the islands, which were speedily occupied. Their plan of battle called for the despatch of a division some eight miles up stream to cross the river a day ahead of the main forces and to take the Russian position in flank. To divert attention from this manœuvre, preparations were carried on as if for a crossing of the river at Antung below Wi-ju, and a fleet detachment made a demonstration in force against the Russian right at the mouth of the Yalu. On April 29 the northern Japanese division effected a crossing as planned, at Su-kau-chen, and advanced in a southwestern direction against the Russian left flank. During the night of April 30 and the early morning of May 1 the two other divisions crossed from the islands to the Manchurian bank under the Russian fire and, joining hands with the northern division, formed a line of battle with a front of 6 miles and 124 guns. Early in the morning of May 1 they advanced to the attack, fording the Ai river, a tributary of the Yalu, under the Russian guns, and displaying for the first time that courage which was to continue manifesting itself through every succeeding crisis of the war. The Russian position at Kiu-lien-cheng was carried, and the enemy, outnumbered and outflanked, was driven with loss towards Feng-hwang-cheng. At Hamatan or Ko-ma-tung the fugitives, with the aid of reserves, made a desperate stand for two hours but only to be completely surrounded. So unskilful a disposition had the Russian commander made of his resources, that it is estimated that less than half of an army of twenty thousand men was brought into battle against forces at least five times superior. The Russians lost 2300 officers and men, and 30 out of 32 guns; the Japanese loss was given at 1100 men, chiefly incurred in the fording of the river. On May 6 General Kuroki occupied Feng-hwang-cheng where the First Army waited for the development of the campaign in other parts of the field. Russian activity was confined to cavalry demonstrations by the Kossacks under Generals Mistchenko and Rennenkampf. On May 10 a Kossack force, advancing from northern Korea, attacked the garrison at An-ju but was repulsed.

Battle of Kin-chow or Nan-shan and the Investment of Port Arthur. Following close upon the victory of the Yalu the disembarkation of a second army under General Oku was begun at Pi-tse-wo on the eastern coast of the Liao-tung peninsula on May 5. It was destined for the investment of Port Arthur. On May 7 Pulantien was occupied and the Port Arthur railway was temporarily cut, though it was not till the 10th that the last train left Port Arthur and till the 13th that the way to the north was permanently severed. The Japanese army with a strength of about 40,000 men and 216 guns advanced south with much reconnoissance fighting to the isthmus of Kin-chow, connecting the mass of the Liao-tung peninsula with the smaller peninsula of Kwan-tung, on which Port Arthur is situated. On this neck of land, about two miles in width, part of the garrison of Port Arthur, under the command of General Stoessel (q.v.) took up a strongly fortified position, with the wings resting on the sea at either side, and the centre on a ridge traversing the isthmus from north to south known as Nan-shan and rudely fortified. On May 25 the Russians were driven from Kin-chow town, a little to the north of their fortified line, which was assaulted very early on the following morning. The Japanese utilized to the full their superior artillery strength, bombarding the Russian position from Sampson Hill to the north of the isthmus. The infantry attack began at 9 A.M. and was conducted with extreme fury by the Japanese, who operated from within 500 yards of the Russian trenches. In the beginning, however, they were held back with enormous loss. An interesting feature of the battle was the intimate co-operation between army and fleet on both sides. Japanese gunboats and torpedo boats bombarded the Russian left from the side of Kin-chow Bay, while a Russian flotilla did some damage to the Japanese left from the opposite direction. During the afternoon the Japanese in some places succeeded in establishing themselves within a few hundred yards from the Russian trenches whence they charged again and again but only to wither away at a short distance from the Nan-shan guns. In the late afternoon the position of the Japanese would seem to have been critical and the Russian commander ventured even upon an attempt at a movement around the enemy's left flank. This was successfully parried and preparations were made for a last general assault. The fire of the Japanese guns was concentrated upon Nan-shan and the Russian line showed signs of wavering. Their left began to crumble up under the attack of the navy's guns and the opportunity was seized by the Japanese right to wade into the shallow waters of Kin-chow Bay and to make their way around the end of the Russian position and into the breastworks. Thereupon the Japanese centre and right charged forward and the Russians retreated from Nan-shan, at eight in the evening. The Russian loss was given at 835 officers and men; that of the Japanese at 4300. The Japanese advance posts penetrated to within 15 miles of Port Arthur. On May 30 Dalny was occupied and made the port of disembarkation for a third Japanese army under General Nogi (q.v.). To these new levies, reinforced by some of Oku's victorious troops, was definitely assigned the task

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of reducing Port Arthur while the Second Army (Oku) turned to the north to cope with new developments in that direction.

THE BATTLE OF WA-FANG-KOU OR TELISSU. These new developments consisted in the despatch southward by General Kuropatkin of a corps of 36,000 men with 94 guns under General Stackelberg, having for its object the relief of Port Arthur, and secondarily the blocking of a junction between the army of Oku and a fourth army under General Nodzu (q.v.), which was being landed at Ta-ku-shan, west of the mouth of the Yalu. It is supposed that the march of Stackelberg's corps was undertaken after peremptory orders from St. Petersburg and against General Kuropatkin's better judgment. General Oku marched northward along the Manchurian railway, disposing his forces in three columns, of which the left was flung out far to the west with a view to flanking operations. There was advance post fighting from June 10. On the 14th the Japanese attacked the Russian position on the Hsin-tu heights near Wa-fang-kow, the Russian reserves being placed at Telissu to the north. The Japanese superiority in guns counted and the Russian line was kept warmly engaged by the two eastern Japanese columns, while the western column continued its flanking march. On the 15th it had completed its turning movement and was advancing with an eastern front against the Russian right. General Stackelberg, seemingly not appreciating the importance of this advance massed his forces for an attack on the Japanese right. In spite of the gallantry of the Russian assaulting column it failed because the Japanese right was reinforced at the critical moment. The Russian left withdrew, and at the same time the centre, which had been weakened to reinforce the left for the unsuccessful attack, was pierced by the Japanese. The Russian left and centre broke and fled, carrying along with them the right which was fighting gallantly to prevent the Japanese western column from cutting the line of retreat to Kai-ping. The Japanese loss was 1213 officers and men; that of the Russians was estimated at more than 3500.

THE ADVANCE ON LIAO-YANG. Mention has already been made of the Fourth Army under General Nodzu, which began landing at Ta-ku-shan towards the end of May. This army took up its march in a northwestern direction and on June 8 occupied the important town of Hsui-yen midway between the First Army (Kuroki) at and near Feng-hwang-cheng where it had remained since the battle of the Yalu, and the Second Army (Oku) south of Kai-ping on the Manchurian railway. When Nodzu's army, about the middle of June, had joined hands with the forces of Kuroki and Oku, the great preliminary step towards what must have been from the beginning the object of Japanese strategy had been made. That object was a concentrated movement against Liao-Yang, where the first great, and, if possible, the decisive, battle of the war would be fought. The preliminary step was the alignment of a preponderant force along an extensive crescent-shaped front which was to be gradually brought nearer to and contracted about Liao-Yang. On June 20 Marquis Oyama (q.v.) was appointed commander-in-chief of the Japanese forces in Manchuria with Baron Kodama (q.v.) as his chief of staff; they left Tokio on July 6. The task that confronted the three armies was for Kuroki and Nodzu to break through the passes of the great Shan-a-lin range leading to Liao-Yang, while Oku's forces advanced northward in a level region operating along the Manchurian railway.

On June 25 General Kuroki began his march on the extreme east of the Japanese line. The northern Fen-shui pass and Mo-tien pass, defended by General Keller, were taken on June 29 and July 3 after desperate fighting. A Russian counter attack on July 4 was repulsed. A more formidable attempt was made by Keller on July 17 on Mo-tien pass and with like result. On July 19 Kuroki occupied Hsi-ho-yen to the north of Mo-tien and seriously menaced the Russian left flank. On July 31, Kuroki began a desperate assault on Yan-su pass about 15 miles west of Mo-tien and on the more northern Yu-shu pass 4 miles west of Hsui-ho-yen. Unsuccessful the first day, the Japanese renewed the assault on August 1 and made themselves masters of the positions, while the Russians, with heavy loss, retreated to the defenses of Liao-Yang. During the first day's fighting at Yan-su pass General Keller was killed. General Nodzu in June and July had occupied the Da pass, the southern Fen-shui and other southern passes, and on July 31 defeated with heavy loss a force under General Zassulitch at To-mu-cheng, driving the Russians to Hai-cheng which they evacuated on August 3. General Oku resumed operations against Stackelberg on the extreme west of the line; on July 9 he occupied Kai-ping after slight resistance and on July 24 defeated a Russian corps under General Zurubaieff, near Ta-shi-chao, and on the following day occupied that important town situated at the junction of the Port Arthur main railway and the branch to the port of Niu-chwang. The latter city was also seized and a valuable base secured where the landing of Japanese troops was begun at once. On August 3 active hostilities ceased all along the Japanese line.

THE BATTLE OF LIAO-YANG. The city of Liao-Yang may be pictured as situated at the vertex of an angle whose two sides are the Taitzs River running due east and west and the Manchurian railway running from northeast to southwest. An interior arc, something less than twenty miles in length, would represent the position of the Russian armies, an outer arc of nearly seventy miles would represent the Japanese. The city of Liao-Yang had been rendered almost impregnable on the south and southwest by a chain of forts and redoubts while the outer line of Russian defense ran along a ridge of hills whose natural strength for half its length on the west was increased by fortifications, trenches at the foot of the hills, and an elaborate system of mines and barbed-wire entanglements. Of this second line the main positions were at the hill of Hsin-lin-tun where Stackelberg had 100 guns massed against Oku's front, and at Shu-sha-pan in front of Nodzu. On the Japanese line, Kuroki was nearest to the Russians, on their eastern front, and Oku farthest away. The strength of the combatants has been variously estimated as ranging from 150,000 to 230,000 for the Russians with 650 guns, and about 220,000 for the Japanese with 700 guns.

During the first three weeks of August the two armies were engaged in final preparations for a decisive struggle. It was part of the Japanese plan to attempt a double outflanking of the

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enemy with the strongest stress laid on the movement against the Russian left wing. On August 24–25 Kuroki began operations and gained some successes. On the 26th the Japanese attacked along the entire line and Oku pushed back the Russians to the strong advanced position at An-shan-chan. Nodzu attacked without success. But the hottest fighting took place on the east where Kuroki, on the 27th and the 28th, wrested from the Russians the village of Pe-gu, Ze-gu, and An-ping and pressed the exhausted enemy towards Liao-Yang. The nature of the country on the east did not favor the use of artillery and the conflict raged for two days at close quarters. The forcing back of the Russian right upon Liao-Yang necessitated the withdrawal of the troops on the south and southwest to the second line of defense. An-shan-chan was abandoned and the retreat was accomplished only after tremendous difficulties. The 29th saw no active fighting but under cover of demonstrations by the left column of the First Army aided by Nodzu's right, Kuroki brought his two northern columns nearer the Taitsz in preparation for crossing the river at Sa-kan and Kan-kwan-tun. This he accomplished on the 30th, the date of the real beginning of the battle of Liao-Yang, while Oku and Nodzu by furious artillery onslaughts and infantry charges sought to break through the Russian line, or at the least to hold it engaged while the Russian left was being circumvented by Kuroki. Their assaults were repulsed with tremendous loss to the Japanese, but as only a portion of the Russian line was fortified on the night of the 30-31st, it was turned by the right column of Oku's, and the left column of Nodzu's, army. Their second objective was gained and Kuroki had succeeded in establishing himself on the northern bank of the Taitsz by the 31st. The step ventured on by Kuroki was a rash one. In order to make a dash for the northwest and cut the Russian line of retreat to Mukden he had thrown himself across a river with only two of his three columns and in the face of the enemy. General Kuropatkin on the night of August 31st determined to seize the opportunity thus presented. He decided to withdraw the greater part of his troops from the south across the Taitsz River and to concentrate against Kuroki with overwhelming force, leaving the task of holding back the armies of Nodzu and Oku to the II and IV Siberian corps under the command of General Zurubaieff. These were ordered to fall back to the inner defenses of Liao-Yang, consisting of the forts and redoubts. The retrograde movement was begun on the same night (31st) and was accomplished with marked ability, in the face of repeated charges by the Japanese, who during the night captured Shu-shan hill from which on the following morning they bombarded the railway station of Liao-Yang. The sight of their anticipated prey escaping them to the north stimulated their efforts as they threw themselves against the Russian works. The defenders showed equal resolution. On September 1 Kuroki's northern column had reached the Yen-tai mines near the road to Mukden and had intrenched itself. His central column was intrenched at Syk-wan-tun awaiting the crossing of the third column. Against this second column General Kuropatkin sent the XVIIth Russian corps with orders to regain the heights of Syk-wan-tun and to hold the enemy till the arrival of the corps on the march from the south. The Japanese in spite of a bitter resistance were gradually pushed to the northeast and away from their bridges and thus placed in a precarious position, and General Kuropatkin was preparing to throw the newly arriving troops against Kuroki, with every chance of success, when a blunder on the part of a subordinate shattered his entire plan. General Orloff had been stationed with a division at Yen-tai with orders to attack in flank when the main front attack on Kuroki should be made. Hearing the guns of the XVIIth corps in the preliminary fighting at Syk-wan-tun, he set off prematurely, marching in a southwesterly direction and without making reconnoissances. Stumbling through the fields of tall millet the division was ambushed by the northern Japanese column and routed with great loss. The Russian commander-in-chief thereupon decided that it would be vain to throw his exhausted troops against a victorious enemy and, contenting himself with holding back Kuroki, gave orders for a general retreat. This was conducted with great skill, while the Japanese redoubled their efforts to break through the Russian covering line. The Russians succeeded in maintaining themselves, and Kuroki's troops, exhausted by days of incessant fighting, could not press the retreat. On the south the two heroic Siberian corps held their positions until late on September 3, when the commander-in-chief ordered the evacuation of the city. The rear-guard under General Zurubaieff held out until the early morning of September 4, when it retired burning the bridges behind it. The Japanese entered Liao-Yang at 9 A.M. of the 4th. The Rusians made good their retreat to Mukden, where their main force was assembled on the 7th. The Japanese did not attempt to pursue. The Russians lost 542 officers and 15,500 men; the Japanese, 600 officers and from 18,000 to 21,000 men. The Japanese line advanced north and established a new front running left to right, from Yen-tai about fifteen miles north of Liao-Yang southeastward to Pen-hsi-hu on the Taitsz River, where was Kuroki's main strength.

BATTLES OF THE SHA RIVER AND HEI-KU-TAI. On September 25 the Czar ordered the formation of a second Manchurian army which was placed under the command of General Grippenberg (q.v.). On October 2, in a rather grandiloquent pronunciamento to his army, General Kuropatkin declared that the time had come for the Russian army to take the offensive and "to compel the Japanese to do our will." On October 5, the Russian army began the march to the south and on October 9 issue was joined by a strong attack on the forces under Kuroki on the Japanese right. It was Kuropatkin's aim to turn Kuroki's flank, and, descending westward along the Taitsz River, to take the Japanese in the rear, while a frontal assault was being made along the entire line. The attempt began auspiciously with the crossing of the Taitsz about 40 miles east of Liao-Yang and with the capture of some Japanese positions near Pen-hsi-hu on the first day of the fighting. But on October 10, Kuroki, whose communications had thus been cut, succeeded in regaining the lost ground. On the same day battle was joined along the whole front. From the 12th to the 15th the Russians were pressed back on the Sha River and threatened with the destruction of their bridges. Kuropatkin weakened his

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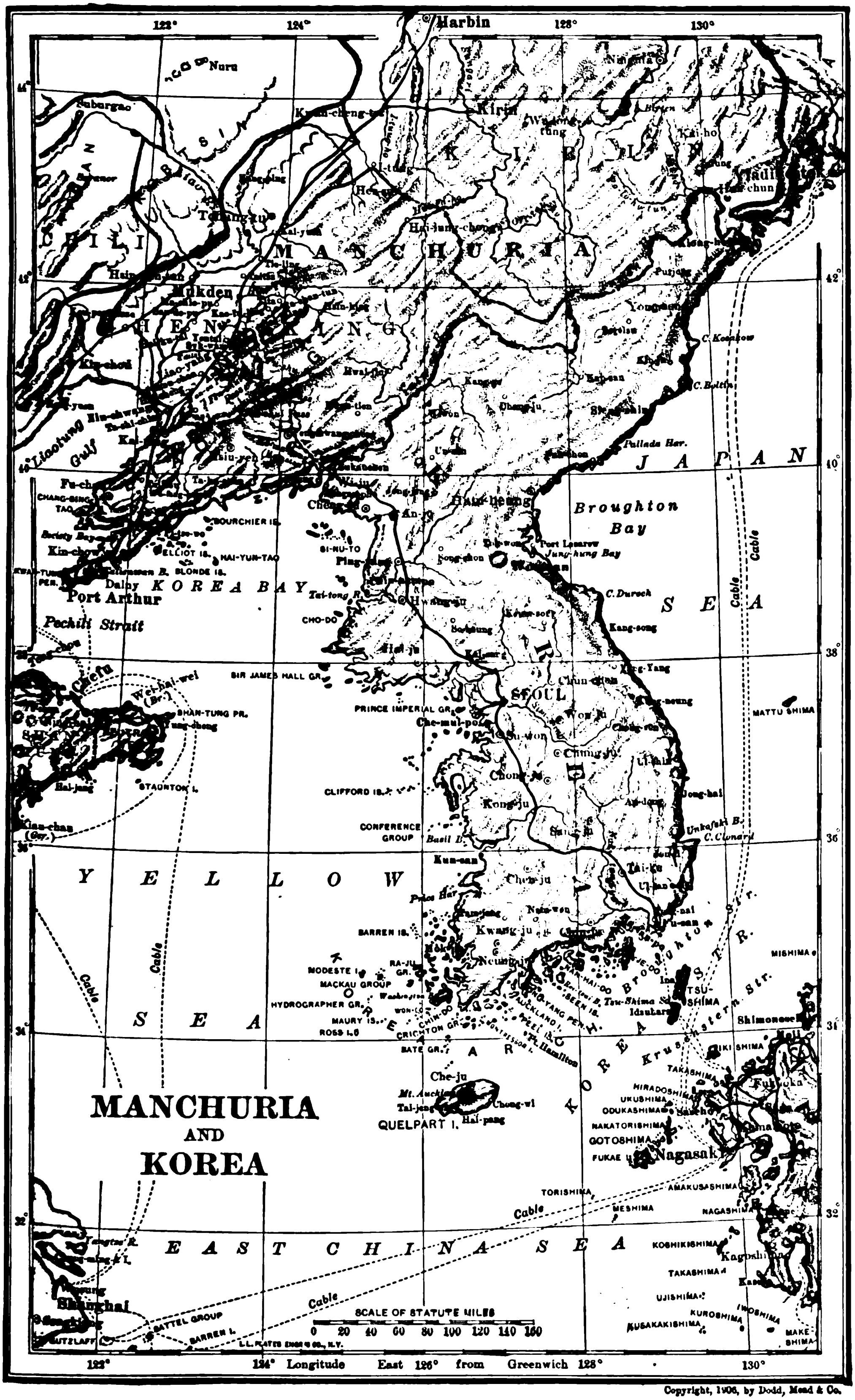

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centre to reinforce his right, and as Nodzu took advantage to advance in the centre Kuropatkin ordered a retreat of his whole army to the next line of hills. This practically broke the line between his left and centre. The retirement of the main forces was begun on the 13th. The retreat was cleverly executed by the troops opposed to Kuroki, who allowed himself to pause in front of a mere cavalry screen of Mistchenko's cavalry. Fighting did not cease till the 18th. The losses were enormous on both sides, that of the Russians being placed at 60,000, or 25 per cent. of the their forces engaged. General Kuropatkin proceeded to carry out a reorganization of his troops which were divided into three armies of 4 corps each under the command of Generals Linievitch (q.v.) Kaulbars (q.v.), and Grippenberg, with a total estimated strength of 250,000 men. Early in January, 1905, General Mistchenko's cavalry executed a daring raid around the Japanese left as far as Niu-chwang. But of greater import was an attempt made by General Grippenberg in the later part of the month. With a force of some 85,000 men and 350 guns he crossed the Hun River on the 25th and carried the village of Hei-ku-tai on the extreme left of the Japanese line. At the same time the village of San-de-pu to the westward was assailed, and had it been carried a division of Oku's army would have been completely envolved. But San-de-pu was strongly fortified and held out until reinforcements arrived on the 27th. On the 29th the Russians were driven back across the Hun River with a loss of 10,000 men. The Japanese loss was 7000. General Grippenberg ascribing his defeat to the failure of General Kuropatkin to co-operate by a general attack, laid down his command on February 3, and was succeeded by General Bilderling.

The Siege and Fall of Port Arthur. While the three Japanese armies were thus pushing the Russian army farther from the seaboard, a fourth army (the Third Army, officially) under General Nogi was engaged in the reduction of Russia's great naval base in the Kwan-tung peninsula. General Nogi had taken up the task where General Oku had left it after the battle of Kin-chow. After that defeat the Russians had retired to an exterior line of defense stretching across the peninsula of Kwan-tung from Sia-ping-tao northward through Kien and Wai-ten hills. On June 26, 1904, General Nogi began an assault on this line and by the first week in July the Russians had been driven to a second line running almost parallel to the first, from the bay of Yin-chen on the north to the western shore of the bay of Lung-wang on the south. With July 26 began four days of terrific fighting in which the Japanese displayed a fanatic infatuation for death. On the 26th and the 27th, the assaults of the Japanese were repulsed, Russian and Japanese ships taking part in the fighting as at Kin-chow. On the evening of the 28th, however, General Stoessel withdrew his left and centre to Wolf's Hill. The struggle was renewed on the 30th, when Stoessel retired from Wolf's Hill and within his permanent works. The Japanese had thus penetrated to within 2½—5 miles from the main works. On August 7 naval guns were planted on Wolf's Hill and a bombardment of the Russian ships in the harbor was begun. The Japanese fire was reinforced when on the night of the 8th they assaulted Taku Hill and took it after fifteen hours' fighting. Siege guns were mounted upon Taku and it was perhaps the increased hail of shot which fell from Taku and Wolf's Hill that drove the Russian fleet to make the attempt of August 10 at breaking through Togo's lines. On the same day the Japanese attacked the Russian infantry positions in front of the works and were repelled with fearful loss. On August 16 Nogi made a formal demand for the surrender of the fortress and Stoessel's refusal was followed by a general onslaught lasting from August 19 to August 24. But in spite of enormous loss during the five days' fighting, estimated at 14,000, the besiegers made little progress.

As a result General Nogi abandoned the method of advance by assault, under which his army was melting away, for the regular siege methods of approach by sap and parallel. No strikingly novel features were developed in the conduct of the siege operations though well established principles were applied by the Japanese engineers with great ingenuity. By the latter part of October the Japanese saps had been carried to within 150 feet of the counter-scarps of the Sung-shu, Er-hlung, and East Kee-kwan forts, which constituted the main position on the northeast and east of the town. There was a tremendous bombardment of these forts from October 25 to October 28, and on the 30th the crests and glacis of the Sung-shu, Er-hlung, and the north fort of Kee-kwan were occupied. On November 26 the besiegers began a fierce attack on the great central forts. On the west, 203 Metre Hill was occupied on November 30, but the attack on Er-hlung and Sung-shu failed. The slaughter was so appalling that a six hours' suspension of hostilities was agreed upon on December 2, to permit of the burial of the dead, whose presence was a menace to both armies.

The end of Port Arthur came rapidly. Directed by observations from 203 Metre Hill the Japanese, on December 3, resumed the bombardment of the harbor, heavily damaging the Russian fleet. On December 18 the north fort of East Kee-kwan was taken and on December 22 Pigeon Bay Promontory was occupied, completing the loss of the Russian advanced defenses on the west. Er-hlung was mined, breached with dynamite, and carried by assault on December 28; and Sung-shu was taken on the last day of the year. On New Year's day, 1905, H fort, Pan-lung Hill, and the Wan-tai forts were taken, thus giving the Japanese possession of all the east ridge fortifications. On the following day the Russians blew up East Kee-kwan and Q forts and destroyed the shipping in the harbor. On December 31 General Stoessel had written to General Nogi opening negotiations for surrender. The Japanese commander replied on January 1, and the terms of capitulation were settled and signed on the afternoon of the following day. Between January 3 and January 7 the evacuation of Port Arthur by the Russians was accomplished. The fortress surrendered with all its property and defenders, the parole being extended to all officers who wished to make use of it. The Japanese reported the surrender of 17 admirals and general officers, 1439 officers, and 40,185 non-commissioned officers and men. Of these 15,307 were sick and wounded. There were also taken 528 guns with 206,000 rounds of ammunition.

The Battle of Mukden. The fall of the great fortress relieved Nogi's army for service in the north, and by February 20 the veterans of Port

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Arthur had taken their place on the front at the extreme west of the Japanese line and somewhat south of the position held by the other armies. A fifth army composed of reservists under the command of General Kawamura had been placed in the field on the right of Kuroki, the armies in the Japanese battle line, counting from east to west, being Kawamura, Kuroki, Nodzu, Oku, and Nogi. Ever since the battle of the Sha River the hostile armies had confronted each other over lines which gradually increased in length to about 60 miles with their centres along the Sha river about 20 miles south of Mukden. In places the lines were not twenty yards apart. It was the Japanese purpose to execute a vast flanking movement around the Russian right with Nogi as the instrument, and it was General Kuropatkin's fatal error that in anticipation of a turning movement on his left he weakened his line on the other flank, and sent a large force from his reserves to Ma-chun-tun and Ti-ta. The preliminary fighting was begun on February 19 by Kawamura, who crossed the frozen Taitsz River, and after prolonged assaults carried the Ching-ho-cheng defile on the 24th. On the 28th he was in front of the strongly fortified Russian positions at Ma-chun-tun and Ti-ta, southeast of Fu-shun. Further to the west Kuroki advanced from the Pen-hsi-hu district upon Kao-tu-ling. Nodzu also made a slight advance. Oku and Nogi as yet did not enter the conflict, though the latter had begun his march to the north on Febuary 26.

On February 28 began the real battle of Mukden, which was not to end till 12 days later, as the most tremendous struggle between two armies in history. On that day Oku began his advance northward between the Sha and the Hun rivers, while to the west, between the Hun River and the Liao, Nogi's columns hurried in the same direction. On March 1 the head of Nogi's army had reached Hsin-min-tun, about 33 miles directly west of Mukden, and he began to veer his line towards Mukden, with an eastern front extending over 15 miles. Only then did Kuropatkin become aware of the danger which threatened the line of his retreat to the north, and he attempted to drive back Nogi and Oku, to the south and east of Nogi, by sending two divisions of his reserve to reinforce the right. But to prevent his giving sufficient attention to the need of the Russian right wing, Nodzu and Kuroki, on the south front, delivered furious attacks against the Russian centre which were repulsed with loss. By March 5 Kaulbars, in command of the Russian right, had been compelled to face about westward on a line running from Ma-chio-pu north-northeast. The Russian line that day was in form a crescent with its horns twisted north, on the west by Nogi, and on the east to a less degree by Kuroki and Kawamura, and it was the intention of the Japanese to continue pressing back the horns of the crescent until they should meet and form a circle with Mukden and the Russian army in the middle. On the 5th Kuropatkin began to draw in another division from the east but when these, with the former reserves, failed to make any impression on the two western Japanese armies, he determined on the 8th to withdraw his entire left and centre across the Hun River and to throw his main strength against Oku and Nogi. The Russian left under Linievitch during the 8th and 9th effected its withdrawal across the river without serious harm and prepared to make a stand. But at Mukden the situation was a hopeless one. The forces of Kaulbars were exhausted, the reserves were used up, Mukden was congested with troops arriving from the centre, and exposed to a destructive cross fire, while Nogi was fast closing up the line of retreat to the north.

The situation on the 9th would be represented by picturing Mukden as deep within a bottle-shaped curve whose sides were constituted by the two western Russian armies, with a narrow opening only to the northeast, where Linievitch was keeping back the Japanese right. The sides of the bottle were being contracted by Nogi from the northwest and by Oku and Nodzu from the southwest and the south. Desperate though conditions were, Kuropatkin, by equally desperate attacks, had succeeded finally in checking Nogi and Oku for a time, when news reached the commander-in-chief that the centre had been pierced between Linievitch and Bilderling, and though only a few Japanese troops had in reality penetrated the line, Kuropatkin feared the complete envelopment of his two western armies, and on the evening of the 9th gave the order for retreat. Mukden was occupied by the Japanese on the following morning, though parties of Russians continued to maintain themselves in the surrounding villages till the next day. On the 10th Nogi was square across the line of retreat. Mukden had thus been enveloped, but not with the inclusion of the entire Russian army, since the Japanese line had been drawn not around the Russian left wing but through a gap in the Russian centre. The eastern Russian army under Linievitch made good its retreat to the north; part of Bilderling's army escaped in disorder. But the bulk of Kaulbars's army was caught within the Japanese cordon around Mukden. The Russians made good their retreat through Tie pass. The Russians lost over 40,000 prisoners and left 26,500 dead on the field. The Japanese losses were given at 882 officers and 41,212 men. There was no further serious fighting in Manchuria till the end of the war.

Occupation of Saghalien. On July 7 an army under General Haraguchi landed in southern Saghalien and on the following day occupied Korsakov, which was abandoned by its garrison. A few days later the Russians were defeated at Daline. Alexandrovsk, the capital of the island, was occupied on the 24th, and Rykoff, in the interior, was taken three days later. On the 31st the Russian military governor surrendered and the conquest of the island was complete. A Japanese landing on the Siberian coast at Castries Bay was made on July 24.

The Peace of Portsmouth.

On June 8, 1905, President Roosevelt addressed to the governments of Russia and Japan a note, in which he proffered his services towards the re-establishment of peace in the Far East. On June 10, the Japanese government declared itself prepared to proceed with the nomination of peace plenipotentiaries, and Russia took similar action two days later. Washington was fixed upon as the meeting-place for the peace conference; actually, however, it assembled at Portsmouth Navy Yard, which was chosen probably with a view to promoting the comfort of the negotiators during the heat of summer. The representatives of

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Japan, Baron Jutaro Komura (q.v.), Japanese minister of foreign affairs, and Kogoro Tokahira (q.v.), Japanese ambassador at Washington, arrived in New York on July 25, and on the 27th they were received by President Roosevelt at Oyster Bay. The Russian delegation, headed by Sergius Witte (q.v.), whose colleague was Baron Rosen, the Russian ambassador at Washington, arrived in New York on August 2. On August 5 the peace delegates of the two nations were formally received and introduced to each other by President Roosevelt, on board the *Mayflower*, in Oyster Bay.

The Conference met at Portsmouth Navy Yard on August 9, for the purpose of deciding on matters of procedure and detail. In the session of August 10, Baron Komura submitted the Japanese terms of peace in writing. On the 12th the Russian reply was presented. It accepted some of the Japanese proposals and rejected others. It was then agreed to take up the discussion of the Japanese terms by clauses, leaving the contentious articles to the end. It became known that of the round dozen of demands presented by the Japanese the Russian plenipotentiaries stood ready to accept all but four. These were, the payment of an indemnity by Russia; the cession to Japan of the Island of Saghalien; the surrender of such Russian war vessels as had escaped from the scene of hostilities and found refuge in foreign harbors; and the limitation for the future of Russia's strength in the Far East.

On August 18 the Conference agreed to the last of the non-contentious points. The four points in dispute were disposed of by recording a définite disagreement, whereupon the negotiators adjourned till August 22. It thus seemed as if the Conference were doomed to failure, and as a matter of fact, as a conference, it failed to bring about peace. In subsequent negotiations the peace plenipotentiaries acted merely as the agents of their governments, by whom the direct conduct of affairs was now assumed. This result was due to the action of President Roosevelt, who late in the night of August 18 summoned Baron Rosen, the junior Russian plenipotentiary, to Oyster Bay. To Baron Rosen, on August 19, the President is said to have expressed his anxious desire that the work of the Conference should not prove fruitless, and to have tendered his good offices for the avoidance of such an outcome. Baron Rosen returned to Portsmouth the same day. From this time the President was in close communication with the governments at St. Petersburg and Tokio; with the former through Mr. Meyer, United States Ambassador at St. Petersburg; with the latter, it was conjectured, largely through the agency of Baron Kentaro Kaneko (q.v.), who was regarded as the personal representative of Marquis Ito in this country, and, consequently, as in favor of a generous policy towards Russia. The peace conference met again on August 22 and August 23. At the later session, or in the course of private communication between the plenipotentaries at about this time, it was understood that the Japanese professed themselves ready to waive the question of an indemnity, of the surrender of the interned ships, and of the limitation of Russia's naval strength in the Pacific, and agreed to give up Saghalien in exchange for a large sum of money, supposed to be about $600,000,000. This proposal was rejected by the Russian representatives as amounting in effect to the payment of an indemnity in thinly disguised form.

On August 26 United States Ambassador Meyer informed the President of the utmost concessions to which the Russian government would agree,—the surrender of the southern half of Saghalien, together with reimbursement of the outlay incurred by Japan in the entertainment of the large number of Russian prisoners of war. Thereupon, the prime centre of negotiations shifted to Tokio, where the President's influence sought to make itself felt. On August 28 there was a prolonged session at Tokio of the Cabinet and the Elder Statesmen under the presidency of the Emperor, the outcome of which was made apparent on the following day at Portsmouth, when, greatly to the surprise of the Russians, the Japanese plenipotentiaries, waiving their claim for indemnity, agreed to make peace on the basis of the Czar's ultimatum. The treaty was signed at Portsmouth on September 5 and was subscribed by the two emperors in duplicate on October 14.

The terms of the treaty of Portsmouth, which is in fifteen articles with two supplementary paragraphs, are as follows: Russia cedes to Japan that portion of the Island of Saghalien lying south of the fiftieth parallel of latitude, the two powers agreeing not to take any military measures that would impede the free navigation of the Straits of La Pérouse and Tartary (Art. IX). Russia transfers to the government of Japan, with the consent of the Chinese government, the leasehold of Port Arthur, Ta-lien, and adjacent territory in the Liao-tung peninsula (V), as well as the railway from Port Arthur to Chang-Chun or Kwang-cheng-tse (a town north of the half-way point from Mukden to Harbin), together with all coal mines owned and operated by the railway (VI). Russia recognizes the paramount position of Japan in Korea with the right to take such measures for guidance, protection, or control as may be deemed necessary (II). Japan and Russia engage to evacuate Manchuria completely and simultaneously and to restore it to Chinese administration (III) within a period of eighteen months (Additional Article I), reserving the right to maintain guards for the protection of their railway lines, with a maximum of fifteen guards per kilometre; the railways in Manchuria are not to be exploited for strategic purposes (VII). Russia and Japan engage not to interfere with any measures common to all countries which China may take for the development of commerce and industry in Manchuria (IV). Russia grants to Japanese subjects the rights of fishery along the coasts of the Russian possessions in the Japan, Okhotsk, and Bering Seas (XI).

International Law and the War. The war in the Far East brought forth nothing distinctly new as regards International Law, but two or three fairly well accepted principles received further interpretation, and this interpretation is unfavorable to belligerents. The principle which has received most extensive modification is that which concedes to belligerent ships the privilege of entering neutral ports for the purpose of temporary asylum, procuring stores, or effecting repairs. Previous to the Russo-Japanese War the limitations of this privilege were ill-defined. The broad rule that neutral ports should not be used as bases for taking on large quantities of coal and other

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stores, and from which to operate against the enemy, was generally accepted. The amount of coal and stores which might be taken on by a vessel was commonly agreed to be the least which could enable her to reach a port of her own country. But the duration of asylum and the extent of permissible repairs were without definite limitation by international agreement.

The occurrences of the war gave a definite interpretation to the rule that "Any vessel of a belligerent which enters the port of a neutral must leave within twenty-four hours or submit to disarmament and internment of the personnel." The rule admits of relaxation in case of repairs made necessary by accident or stress of weather and in no way attributable to the war, but even such repairs must not be extensive. As to coal, the rule that a belligerent may take on enough coal to reach the nearest port under her flag still holds, but it is likely to receive early attention, for it may, and usually does, involve completely filling the bunkers. With a sufficient number of neutral ports (of different nations) at hand, it is manifest that the belligerent can keep the sea for a long time, and is therefore receiving important neutral aid. The question of food supply to a belligerent remains unchanged, but its importance is decreased if coal and other supplies be refused. The foregoing rule as to asylum, supplies, and internment has received the assent of China, France, Great Britain, Germany, Japan, Russia, and the United States. The acquiescence of France is less full and unreserved than that of the others, but it appears to be undoubted. The rapidity with which the principle of disarmament and internment has been accepted is most unusual in international questions, and points toward a lessened privilege of belligerents and an extension of the influence of neutrals in questions of war.

The proclamations of both belligerents were in tolerable accord with the general rules of belligerency. As regards neutrals, Japan was by far the most liberal, both as to precept and practice. Russia, finding it to her interest to do so, declared coal unconditional contraband, notwithstanding the fact that in 1884 she had declared that under no circumstances would she recognize coal as contraband. A Russian prize court at Vladivostok condemned flour and telegraph, telephone and railway materials consigned to merchants in Japanese ports. And the Russians sank two neutral vessels which had never been condemned by a prize court, on the ground that they had not coal enough to reach Vladivostok. The protests of the United States and Great Britain caused the Russian government to recede from its extreme position in regard to the trade of neutrals with non-blockaded ports of the enemy's country in articles not necessarily contraband of war, and concerning which there was no proof of belligerent destination.

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RUSSO-TURKISH WAR (1877-78). A conflict between Russia and the Ottoman Empire, growing out of the condition of the Balkan countries and involving an effort on the part of Russia to extend her dominion in the direction of the Mediterranean. (See EASTERN QUESTION.) In 1875-76 risings against Turkish misrule broke out in Bosnia and Herzegovina. Encouraged by Servia and Montenegro, and probably by Russia, the spirit of revolt spread. The Bulgarian atrocities in May, 1876, called the attention of the Western Powers in a forcible manner to the state of affairs in the Balkan provinces. Gortchakoff, Andrássy, and Bismarck drew up the so-called Berlin Memorandum, but the habitual failure of the Powers to agree in their action prevented the diplomatic representations made at Constantinople from having any result. Servia and Montenegro began open war against the Porte in July, 1876. England supported the Porte in spite of the vigorous assaults upon the Turkish policy by Gladstone. Austria-Hungary and Germany avoided committing themselves to any policy. The Magyars openly expressed sympathy with the Turks. Servia succumbed to the overwhelming forces of Turkey in October, but the Montenegrins, assured doubtless of Russian support, kept the field. After sounding the other Powers in regard to their attitude and finding no inclination to guarantee reforms in Turkey, Russia concluded a treaty with Rumania in April, 1877, and, announcing herself as the protector of the Balkan Christians, declared war against the Ottoman Empire on the 24th. The advance of the Russians was rapid. The Danube was crossed at Galatz, on June 22d, by a portion of the forces, and on June 27th the main army crossed at Simnitza, into Bulgaria. In July the Czar joined the army in the field of operations. General Gurko took possession of Tirnova on July 7th, and a week later he crossed the Balkans. The Russian lines faced eastward toward Rustchuk, Rasgrad, and Shumla; southward from Tirnova to the Shipka Pass; and westward toward the Osma and Vid rivers. The Turkish Army of the Danube on the east was commanded by Mehemet Ali; Reuf Pasha commanded the Army of the Balkans, to which was intrusted the defense of the Shipka Pass, but was soon superseded on account of inefficiency by Suleiman Pasha. Osman Pasha took up a strong position at Plevna (q.v.) on the right flank of the Russians. The unexpected and desperate resistance offered by Osman Pasha arrested the Russian advance. On July 30th he beat back a division of the army of the Grand Duke Nicholas, under General Krüdener, with great slaughter. Early in September the attack was renewed in great force by the Russians and Rumanians, but Osman held his own, and a desperate assault on the 11th proved disastrous to the assailants. The Russians then decided to invest the place. In the meanwhile, General Gurko, who had been advancing upon Adrianople, was defeated by Suleiman Pasha at Eski-Zagra, and driven into the Shipka Pass, where he succeeded in holding his ground against the furious attacks of Suleiman. In August and September Mehemet Ali operated successfully against the Russian left under the Crown Prince Alexander in the region of the River Lom. Everything now depended upon the ability of Osman Pasha to hold out at Plevna. General Gurko was sent to

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operate in the rear of the place and his successful movements rendered relief impossible. On December 10th Osman Pasha made a desperate attempt to break through the Russian lines, but was forced to surrender. Suleiman Pasha, who had succeeded Mehemet Ali in the command of the Turkish army in the east, was at first successful, capturing Elena on December 4th, but on December 12th he suffered a defeat at Metchka, which drove him from the field. The fall of Plevna enabled the Russians to undertake a rapid advance toward Adrianople. General Gurko entered Sofia on January 4, 1878. On January 9th Generals Mirski, Skobeleff, and Radetzky captured the Turkish forces in the Shipka Pass. The army of Suleiman Pasha, who attempted to check the Russian advance, was shattered in three days' fighting near Philippopolis, and on January 20th Adrianople was in the hands of the Russians. Servia had declared war on December 14, 1877. On January 10, 1878, the Servians took Nish, and on the same day Antivari fell into the hands of the Montenegrins.

In Armenia the Russians had been equally successful. Four columns crossed the frontier on April 24, 1877, Loris Melikoff (q.v.) being in charge of the campaign. The first, moving on Batum, was driven back; the second stormed Ardahan on May 17th; the third besieged Kars and also advanced on Erzerum, but was checked by Mukhtar Pasha, the Turkish commander in Armenia, and retired to Alexandropol; the fourth took Bayazid, but, losing the support of the third, was forced to abandon it and retreat. Here, as in Europe, the Russians underestimated their opponents at the outset. In October the campaign was renewed. Mukhtar Pasha was completely defeated by the Grand Duke Michael at Aladja Dagh on October 15th and retreated upon Erzerum, which he held until after the close of hostilities in Europe. Kars fell on November 18th.

By the end of January, 1878, the Russians had advanced to the neighborhood of Constantinople, and the Ottoman Empire was at the mercy of the enemy. On January 31, 1878, an armistice was signed by which the Porte gave up all fortified places north of a line drawn from San Stefano, on the Sea of Marmora, to Derkos, on the Black Sea. The Treaty of San Stefano between Russia and the Ottoman Empire was signed March 3, 1878. In the meanwhile, on February 13th, a British fleet had entered the Sea of Marmora in order to guard against any intention on the part of the Russians to enter Constantinople. The Powers, unwilling to accord to Russia the aggrandizement involved in the Treaty of San Stefano, intervened (England even going so far as to embark a force of Sepoys for service against the Russians), and a congress was called at Berlin to revise the treaty and effect a new settlement of the Eastern Question. See BERLIN, CONGRESS OF.

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RUST (AS. *rust*, OHG. *rost*, Ger. *Rost;* connected with OChurch Slav. *rŭzda*, Lith. *rūdis*, Lett. *rusa*, Lat. *rubigo*, rust, and with Goth. *raups*, AS. *rēad*, Eng. *red*, OHG. *rōt*, Ger. *rot*, Lat. *rufus*, *ruber*, Gk. *ἐρυθρός*, *erythros*, OIr. *ruad*, OChurch Slav. *rŭdrŭ*, Lith. *rūdas*, Skt. *rudhira*, red). Parasitic fungi (Uredinales, q.v.), especially injurious to wheat, oats, and other cereals, usually appearing as yellow, brown, or black lines and spots on the leaves and stems. The name is often applied with various qualifications, as white rust, etc., to diseases of other plants, but as commonly regarded by botanists it applies only to the Uredineæ. Nearly all cereals are subject to the attack of rust, and from an economic standpoint this is one of the most serious pests of grain crops. In 1891, a season especially favorable to the rusts, the estimated loss to wheat, barley, rye, and oats in Prussia, as stated by a commission, was over $100,000,000. In Australia, it is said, the loss to the wheat crop is ten to fifteen million dollars annually, and in the United States it is equally great, or even greater, for seldom is a field entirely free from it and sometimes a considerable portion of the crop is destroyed. As generally understood the most common and destructive species, at least in the United States, are *Puccinia graminis* and *Puccinia rubigo-vera* on wheat, oats, barley, and rye, and *Puccinia coronata* on oats. Investigations conducted in the United States and Sweden have shown that there are specialized forms of the first two species that occur only upon certain host plants. All of these rusts pass through three stages in their life cycles—uredospore and teleutospore stages upon cereals and an æcidial stage upon some very dissimilar plant. For *Puccinia graminis* the æcidial stage is upon the barberry, for *Puccinia rubigo-vera* upon members of the borage family, and for *Puccinia coronata* upon the buckthorn (*Rhamnus lanceolata*) and related species. The æcidial phase of these rusts, being passed upon plants of little economic value, is not considered as injurious. The uredospore stage, called red, brown, or yellow rust, is passed upon the leaves and stems of the cereals; the black rust or teleutospore is the winter stage, in which the spores are thick-walled and remain in the dead leaves and stubble through the winter. The general facts regarding the life history of all are the same, and that first discovered, *Puccinia graminis* of wheat, which was worked out by Debary in 1864, will serve as an example. Under normal conditions small cup-like depressions appear in the spring on both surfaces of the barberry leaves. The true cluster cups, as they are called, which appear upon the lower side of the leaves, are crowded with spores, which are blown about by the wind, and, falling upon wheat, germinate and gain entrance into the tissues. Once inside, the mycelium develops with the growth of the wheat and about harvest time a crop of spores is produced. These red rust spores are blown about and produce new rust spots wherever they alight upon a similar plant, causing injury by dwarfing the plant and shriveling the grain. Later in the season black lines of spores are produced upon stubble or the leaves of

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plants that remain. The thick-walled, two-celled resting spores produced at this time will not germinate until they have hibernated, but in early spring they germinate upon barberry plants, forming what are called basidiospores, or sporidia. Thus the life cycle is completed.

While progress seems to have been made in combating many plant diseases by means of fungicides, etc., little has been accomplished in the prevention of wheat rust in spite of the attention and study given to this problem. While apparently no variety is wholly exempt, there is great variation in the susceptibility of different varieties. As a rule the hard red wheats, the leaves and stems of which have a decided bloom, are more resistant than others, and resistant varieties will probably be developed along this line, as also in the breeding of early ripening varieties, which largely escape injury. Since late sowing upon moist soils almost always results in a badly rusted crop, such should be avoided.

Consult: Carleton, "Cereal Rusts of the United States," *United States Department of Agriculture, Division Vegetable Pathological Bulletin 16* (Washington); Eriksson and Hennings, *Die Getreideroste* (Stockholm, 1896); Eriksson, "The Present Status of the Cereal Rust Problem," *Botanical Gazette 26* (1898), p. 37; Hitchcock and Carleton, "Rusts of Grain," *Kansas Experimental Station Bulletins 38 and 46* (Manhattan, 1893, 1894); Galloway, "Experiments in the Treatment of Rusts of Wheat and Other Cereals," *United States Department of Agriculture Report* (Washington, 1892); McAlpine, *Report on Rust in Wheat Experiments* (Melbourne, 1894); Sorauer, *Pflanzenkrankheiten* (Berlin, 1896).

RUS'TAM. A legendary Iranian hero, whose adventures are related in the *Shāh-Nāmah* of Firdausi (q.v.). During the first day of his life he grew as much as other children do in a year. Before reaching manhood he entered the fortress of Sipend in disguise and avenged the murder of his great-grandfather Nariman. His father, Zal, made Rustam a Pahlavan or hero of the realm. After some years, on the death of Garshasp or Keresaspa, Rustam was commissioned to offer the crown of Zabulistan to Kai Kobad. This accomplished, he defeated with the help of the new sovereign the armies of the Turanian chief Afrasyab, upon which the Turanian King, Pashang, sued for peace. During the reign of Kai Kaus, the successor of Kai Kobad, the hero performed seven adventures to deliver his King from the ruler of Mazanderan. These adventures are the killing of a lion by Rustam's horse Raksh, the discovery of a spring in a desert, the destruction of an enormous dragon, the killing of an enchantress, the defeat of Aulad, the lord of Southern Mazanderan, who was forced to guide Rustam to the cavern of the White Demon, the defeat of the demon Arzang, and finally the death of the White Demon. Losing his horse Raksh, Rustam visited the city of Samangan to recover it. There he wedded the Princess Tahminah. He was called away, however, and left a bracelet as a token of recognition for his unborn child. This son, Suhrab, was brought up, nevertheless, unknown to his father, and became a famous warrior on the Turanian side. In single combat father and son met, and Suhrab was slain. Recognizing the corpse by the bracelet, Rustam went to Zabulistan, but later renewed the war on the Turanians, and performed countless feats of arms during the three succeeding reigns. The base-born son of Zal, and Gushtasp's son-in-law, named Shaghad, angered by the annual tribute of a cow-skin paid to Zabul by Kabul, finally enticed Rustam with a hundred of his knights to Kabul, where they were entrapped in a park in which pits filled with javelins had been made. Into one of these Rustam fell and perished, living only long enough to shoot a fatal arrow at Shaghad. The Rustam cycle is not found in Iranian literature until a comparatively recent period. The legend was known, however, at least in part, as early as the seventh or eighth century. The episode is familiar to English readers through Matthew Arnold's poem *Sohrab and Rustum.*

RUSTCHUK, or **RUŠČUK,** rus'chuk. A town of Bulgaria, on the Danube, opposite the Rumanian town of Giurgevo, 139 miles northwest of Varna (Map: Balkan Peninsula, F 3). It is an important manufacturing centre, producing tobacco and cigars, soap, beer, and good pottery. Its trade is also considerable. Under the Turks Rustchuk was an important fortress. Population, in 1900, 32,661.

RUSTIC (or RUSTICATED) **WORK** (Lat. *rusticus,* relating to the country, from *rus,* country), and RUSTICATION. The name of that kind of masonry in which the various stones or courses are marked at the joints by plays or recesses. The projecting surface thus left is sometimes called bossed, if the surface is entirely or comparatively dressed, and rustic when left rough and irregular or made artificially irregular. Rustication is chiefly used in Renaissance architecture, particularly in the later period of the Barocco style, although rustic quoins were often used in rough Gothic work.

RUSTIGE, rus'tĭ-ge, HEINRICH VON (1810-1900). A German historical genre and landscape painter and poet, born at Werl, Westphalia. He was a pupil of Schadow at the Düsseldorf Academy, and won success with one of his first pictures, "Swiss Women Seeking Shelter from Storm" (1836, National Gallery, Berlin). In 1845 he became professor at the School of Art in Stuttgart and inspector of the royal galleries. Of his other works may be pointed out "Inundation Scene" (1841), in the National Gallery, Berlin; "Duke of Alva and the Countess of Rudolstadt" (1861), "Otho I. After Conquering the Danes" (1872), both in the Stuttgart Museum; and "Transportation of the Remains of Otho III. Across the Alps" (1863), Stettin Museum. As a poet he was favorably known through several dramas, and through lyrics, both serious and humorous. He also published *Das Poetische in der bildenden Kunst* (1876), an essay in æsthetics.

RUST MITE. See ORANGE INSECTS.

RUSTRE. In heraldry, one of the subordinaries. See HERALDRY.

RÜSTOW, ru'stô, WILHELM (1821-78). A Prussian soldier and writer, born at Brandenburg. Because of the liberal views he expressed in his pamphlet, *Der deutsche Militärstaat vor und während der Revolution* (1850-51), he was court-martialed, but managed to escape before sentence was pronounced on him. He settled in

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Zurich, where he lectured at the university on military science. In 1860 he joined Garibaldi, in Sicily, and distinguished himself by an energetic and decisive attack which did much to decide the battle of Volturno. Upon his return to Zurich he resumed his military studies and became one of the most celebrated of modern writers on military science. His numerous writings include: *Geschichte des griechischen Kriegswesens* (1852-55); *Der Krieg von 1805 in Deutschland und Italien* (1853-59); *Der Krieg und seine Mittel* (1856); *Die Feldherrnkunst des 19. Jahrhunderts* (1857); and *Die ersten Feldzüge Bonapartes in Italien und Deutschland* (1867).

RUTA BAGA. See TURNIP.

RUTE, rut, Mme. DE SOLMS RATTAZZI DE. See BONAPARTE, LÆTITIA MARIE WYSE.

RUTEBEUF, rut'bĕf' (c.1220-c.1285). A French poet of the thirteenth century. His real name is not known. He wrote, often satirically, about the foibles of his time, rebuking monks and nuns, confessing his own sins, and speculating upon life and death. Some of his ideas reappear in Villon two centuries later. Besides his satirical poems, Rutebeuf wrote a number of fabliaux and *Le Miracle de Théophile*, a sort of miracle play. Rutebeuf has the merit of a clear style, which is spicy and original when he is really interested. His *Works* have been edited, with a *Life*, by Jubinal (new ed. Paris, 1874-75). Consult also Clédat, *Rutebeuf* (Paris, 1891); Kressnel, *Rutebeuf, ein französischer Dichter des XIII. Jahrhunderts* (Cassel, 1894).

RUTGERS, rŭt'gĕrz, HENRY (1745-1830). An American patriot and philanthropist, born in New York City. He graduated at King's College (now Columbia University) in 1766, at the outbreak of the Revolution entered the Continental Army, in 1776 took part as a captain in the battle of White Plains, and after the war became successively major and colonel of New York militia. He also took an important part in State politics, and was elected to the Assembly as a Republican in 1784, 1800, 1801, 1802, and 1807. From 1802 to 1826 he was a regent of the University of the State of New York. In 1819 he was a member of a committee organized with a view to perfecting a method for checking the advance of slavery. He is probably best known as the benefactor of Rutgers College (q.v.). He also gave numerous sites for church purposes, and his charities were liberal.

RUTGERS COLLEGE. An institution of higher learning, at New Brunswick, N. J., originally planned by Theodore James Frelinghuysen and Hendrik Fisher, in 1738, but not begun till 1755, when Theodore Frelinghuysen, the son of Theodore James, urged the formation of a college to be nurtured by the Dutch Church, and went to Holland to solicit aid. He died on his return voyage, and it was not until 1766 that the institution was chartered as Queen's College, in honor of Queen Charlotte. The present site of the college was secured in 1808, and the present Middle building, now known as Queen's College, was erected in 1809. In 1825 a gift from Colonel Henry Rutgers, of New York, gave new life to the institution, and the present name was given to the college. A grammar school was established at the same time as the college; medical degrees were conferred upon the students of an affiliated medical faculty in New York as early as 1792; and in 1864 the scientific school was designated by the Legislature as the State College for the Benefit of Agriculture and the Mechanic Arts, to which the act of 1887 added an agricultural experiment station. The classical and the scientific departments of the college are very closely related. In the Classical School the courses lead to the degree of Bachelor of Arts and Bachelor of Letters; in the Scientific School to that of Bachelor of Science. Graduate work leads to the degrees of M. A., Ph. D., and Sc. D. The degree of Civil Engineer is conferred for three years' satisfactory practice and study of engineering. Graduates of the Theological Seminary of New Brunswick may receive the degree of Bachelor of Divinity. The college has successfully developed a system of student self-government. In 1903 there were 62 classical and 161 scientific students, with a faculty of 30. The library contained 45,655 volumes. The endowment was $1,200,000, with an income of about $60,000. The fifteen buildings, including the Ceramics Building and the Ralph Voorhees Library, erected in 1902-03, were valued, with the grounds, at $1,000,000.

RUTH (Heb. *Rūth*, friend), BOOK OF. One of the canonical books of the Old Testament, belonging to the third division of the Hebrew Canon (the Hagiographa). It relates events of the time of the Judges, and in the English Bible, as in the Septuagint and Vulgate, follows the Book of Judges. The Book of Ruth tells how Elimelech, with his wife, Naomi, and his two sons, Mahlon and Chilion, left their home in Judah because of a famine and settled in the land of Moab. There the sons married Moabite women, Ruth and Orpah. Elimelech and his sons died and Naomi decided to return to her native land. She advised her daughters-in-law to remain in Moab and remarry. Orpah complied, but Ruth declared that nothing but death should separate her from Naomi. The two women came to Bethlehem and there Ruth gained favor with Boaz, a kinsman of Elimelech and one of the leading men of Bethlehem. She claimed his protection as a kinsman, at the instigation of Naomi. Boaz was willing to accept the responsibility, but in accordance with custom, a 'nearer' kinsman must be consulted. Summoning the elders of the city as witnesses, Boaz called upon this kinsman to redeem Elimelech's patrimony, which poverty compelled Naomi to sell, involving the duty to marry Ruth in order to "raise up the name of the dead upon his inheritance." The kinsman resigned his rights in favor of Boaz, and accordingly the latter married Ruth, and their first-born son, Obed, became the grandfather of David.

Opinions as to the date and purpose of the Book of Ruth differ. It has been called a religious romance, a purely fictitious narrative told in order to point to a moral, and included in the canon mainly because of the reference at the end to the genealogy of David. The aim of the writer is thought to have been to protest against the tendency, represented in the Books of Ezra and Nehemiah, to condemn marriages between Hebrews and surrounding nations. If David, the ideal Jewish King, were descended from a Moabite woman, mixed marriages could hardly

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be the unqualified evil which the 'legalists' of Ezra's day represented them to be. The declaration of Ruth that Naomi's God shall be her God, and Naomi's people her people (i. 16), is understood by some as a bold protest against the exclusive conception of Yahweh as the God particularly of a single people, and is thought to reflect the theory of universal monotheism of the post-exilic prophets; while others find in it a reflection of that willingness to accept proselytes from other nations which characterizes the fully developed monotheistic faith. On either view the book is certainly post-exilic and may be considerably later than the time of Ezra.

According to another view, the book was written earlier than B.C. 500, and the purpose of the writer may have been to supply information concerning the ancestry of David, omitted in the books of Samuel, or to urge the duty of the next of kin to marry a childless widow. Consult the commentaries of Wright (London, 1864), Keil (with Judges, 2d ed., Leipzig, 1874), Berteau (with Judges, 2d ed., ib., 1883), Oettli (*Die geschichtlichen Hagiographen*, Munich, 1889), Wildeboer (Freiburg, 1898), and Nowack (Göttingen, 1900); also the Old Testament introductions of Reuss, Driver, König, Bleek-Wellhausen, and Cornill, and the works on the canon by Wildeboer (Groningen, 1889; Eng. trans., London, 1895), Buhl (Leipzig, 1891; Eng. trans., Edinburgh, 1892), and Ryle (London, 1892).

RUTHE'NIANS, or **RUSS'NIAKS**. A Slavic people of the eastern group, forming a branch of the Little Russians. They live chiefly in Galicia. The height of the Ruthenian plainsmen of Galicia is 1.640 meters; their cephalic index, 83.4; the height of the Ruthenian highlanders is from 1.666 to 1.670 meters; their cephalic index, 83.6. Chestnut hair and brown eyes characterize about half of the population; the remainder have dark skin and hair.

The term Ruthenian is also applied to the Little Russians of the Ukraine as well as to those of Galicia and the Carpathians. This group, less affected by Mongol invasions and influences, is thought to represent the purest type of the Slav. In the ethnic movements that mark the history of Russia the Ruthenians sank beneath the overwhelming current of the more powerful Slav groups. From the time of the Slav dispersion between the second and sixth centuries to their conquest, partly by Casimir the Great of Poland and partly by the Lithuanians, the Ruthenians were a free people. Many of the old customs are preserved, together with much folklore. The Ruthenians in Galicia number about 3,500,000, and there are over 400,000 in Hungary and 300,000 in Bukowina. In Galicia a bitter political warfare has been going on between the Ruthenians and the Poles, the latter being enabled by their superior intelligence, wealth, and position to maintain the upper hand. Consult Bonmariage, *La Russie d'Europe* (Brussels, 1903).

RUTHENIUM (Neo-Lat., from *Ruthenia*, a name of Russia). A metallic chemical element discovered by Claus in 1845. Osann, in 1828, announced his discovery of three new metals in the platinum ores from the Urals, giving the name ruthenium to one of these metals. The announcement of this discovery he subsequently withdrew, and the existence of the new metal was not accepted until the subject was again studied by Claus, who proved its existence, retaining the old name. It occurs in its metallic state in platinum ores and in osmiridium, also as the sulphide in the mineral laurite. The metal is separated from iridosmium as the oxide by a complicated chemical process, and is then reduced in a graphite crucible and fused by the oxyhydrogen flame.

Ruthenium (symbol, Ru; atomic weight, 101.68) is a white, lustrous, hard, heavy, brittle metal that melts at upward of 2500° C. (4530° F.). It combines with oxygen, forming a monoxide, a sesquioxide, a dioxide, a trioxide, a heptoxide, and a tetroxide, of which the trioxide and the heptoxide are known only in combination. These oxides form various salts, none of which is of any commercial importance.

RUTHERFORD, rŭth'ĕr-fôrd. A borough in Bergen County, N. J., nine miles north by west of Jersey City; between the Passaic and Hackensack rivers, and on the Erie Railroad (Map: New Jersey, D 2). Many New Yorkers have their residences here. In the adjoining borough of East Rutherford are extensive cotton and linen bleaching establishments, steam boiler works, a manufactory of glass mirrors, etc. Each borough maintains a public library. The population of Rutherford in 1900 was 4411, and of East Rutherford 2640.

RUTHERFORD, SAMUEL (1600-61). A Scottish divine. He was born in the parish of Nisbet, now part of Crailing, Roxburghshire, graduated from Edinburgh University in 1621, and became 'regent of humanity' in 1623, but resigned this place in 1626 and turned to the study of theology, which he pursued for a year, and became pastor of Anwoth. When his *Exercitationes Apologeticæ pro Divina Gratia* appeared in 1636, he was brought before the High Commission in Edinburgh, charged with non-conformity to the Acts of the Episcopacy and with attack upon Arminian tenets, with the result that he was forbidden to preach and banished to Aberdeen during the King's pleasure. His exile ended with the covenanting revolution eighteen months later. In 1838 he was appointed professor of divinity at Saint Mary's College, Saint Andrews, and in addition became a colleague to Robert Blair in one of the city churches. He was appointed rector of his university in 1651. From 1650 to the end of his life he was engaged in controversy more or less bitter with any who did not take the rigid view of 'covenanting,' and participated in the protestation to the Assembly at Saint Andrews in 1651 against the lawfulness of the treaty made in 1650 between the Covenanters and Charles II. After the Restoration he lost his official positions, and illness and death intervened to save him from appearing before Parliament on a charge of treason. Little of his work has been preserved except his *Letters*, edited by Bonar, and his *Sermons* (reprinted 1876-85). Consult his *Life*, by Bonar, in the *Letters* (Edinburgh, 1894).

RUTHERFORD, WILLIAM GUNION (1853—). A distinguished English scholar, born in Peeblesshire and educated at Saint Andrews University and Balliol College, Oxford. He was appointed assistant master at Saint Paul's School, which office he continued to hold until 1883, when he succeeded Dr. Charles Brodrick Scott as headmaster of Westminster School. His

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more important publications consist of *The New Phrynichus*, with introduction and commentary (1881), and *Fables of Babrius* (1883). He also published several other works relating to the classics, among them a *First Greek Grammar*, which has gone through several editions.

RUTHERFURD, Lewis Morris (1816-92). An American astronomer, born in Morrisania, N. Y. He graduated at Williams College in 1834, and became a lawyer. But even during his active legal career, which he gave up in 1849, he devoted his spare time to astronomy and built in New York an observatory, which was the primary station for longitude determination. Two years after the construction of the observatory, in 1858, he first attacked the problem of astronomical photography, his work being independent if not earlier than that of De La Rue. Interrupting his research in this direction, about 1862 he began his studies in spectroscopy, following the suggestions of Fraunhofer; distinguished the star spectra by a classification practically identical with Secchi's, and if not prior to Donati, gaining results far more minute and accurate. He constructed a large spectroscope late in 1863, and about the same time realized the advantage over bisulphide prisms of diffraction gratings. For several years he studied Nobert's gratings and finally greatly improved on them. His telescope especially constructed for photography was finished in 1864; a photographic corrector was made in 1868, and in 1876 he devised a glass circle for the measurement of angles. As early as 1865 Rutherfurd had suggested a photographic chart of the heavens. His health began to fail about 1877, and in 1883 he gave up active work and presented to Columbia College his telescope, micrometer, and many of his valuable photographs, which were published by Rees in 1891. He was one of the original members of the National Academy of Sciences.

RUTHERGLEN, rŭth'ĕr-glĕn *or* (locally) rŭg'len. A royal, Parliamentary, and municipal burgh in Lanarkshire, Scotland, on the Clyde, three miles southeast of Glasgow (Map: Scotland, D 4). It was an important town in the twelfth century. It has extensive iron and steel works, and neighboring coal mines. It contains an old church of the twelfth century, and a fine town hall. Population, in 1901, 18,280.

RUTHVEN RAID. See Gowrie Conspiracy.

RUTILE (Fr. *rutile*, from Lat. *rutilus*, reddish, yellowish-red). A mineral, titanium dioxide, that crystallizes in the tetragonal system, and is of a reddish-brown color. It is found in older rocks, in various localities in Norway, in Sweden, in the Urals, and in Switzerland; also in the United States in New England, New York, Pennsylvania, Georgia, North Carolina, New Jersey, and Arkansas. The variety from Graves Mountain, Ga., has furnished a number of specimens that have been cut into gems. When found as fine needle-like crystals in limpid quartz they are called *sagenite, Venus's hair stone*, or *flèches d'amour*.

RUTIL'IUS NAMA'TIA'NUS, Claudius. A Latin poet of the beginning of the fifth century. He was a Gaul by birth, but a patriotic Roman in sentiment, and under Honorius was prefect of Rome. His poem *De Reditu suo* (416), in very good elegiacs, describes his trip from Rome to Gaul. A part of the first and most of the second books are lost. It was edited by Müller (1870) and by Bährens (in *Poetæ Latini Minores*, vol. v., 1883). An excellent sketch of its contents is in "Urbs Animæ," *Atlantic Monthly* (vol. lxii., 1888, pp. 742-752).

RÜTIMEYER, rü'tē-mī'ĕr, Ludwig (1825-95). A Swiss paleontologist, born at Biglen, in the Emmenthal. He studied theology and medicine at Bern, and natural history in Paris, London, and Leyden; became professor of zoölogy and comparative anatomy at Basel in 1855, and made important studies on the early fauna of Switzerland and on craniology. His many and valuable works include: *Beiträge zur Kenntnis der fossilen Pferde* (1863); *Crania Helvetica* (with His, 1864); *Ueber die Herkunft unserer Tierwelt* (1867); *Ueber Thal- und Seebildung* (1869; 2d ed. 1874); *Die Veränderungen der Tierwelt in der Schweiz seit Anwesenheit des Menschen* (1875); *Die Rinder der Tertiärepoche* (1878-79); *Beiträge zu einer natürlichen Geschichte der Hirsche* (1881-83); and *Die eocäne Säugetierwelt von Egerkingen* (1891).

RUT'LAND. The smallest county in England, bounded on the northeast by Lincoln, on the southeast by Northampton, and on the west by Leicester (Map: England, F 4). Area, 152 square miles; population, in 1891, 20,659; in 1901, 19,700. The Wash divides it into two portions, of which the northern is a somewhat elevated tableland, while the southern consists of a number of valleys running east and west, and separated by low hills. The principal stream is the Welland, forming the boundary on the southeast. The chief mineral production is fine building stone. The climate is mild and healthful, the soil loamy and rich. Oxen and sheep are raised in great numbers. The capital is Oakham.

RUTLAND. A town, including several villages, in Worcester County, Mass., 12 miles northwest of the city of Worcester; on the Boston and Maine Railroad (Map: Massachusetts, D 3). It has the State Hospital for Consumptive and Tubercular Patients, and a public library. Population, in 1890, 980; in 1900, 1334. Rutland was settled about 1716, and was incorporated as a town in 1722. In 1777-78 part of Burgoyne's troops, who had surrendered at Saratoga, were quartered here. Rutland was the home from 1781 to 1787 of Rufus Putnam (q.v.), on account of whose influence, as a member of the Ohio Company, in founding the settlement of Marietta, Ohio, the town has been called the 'Cradle of Ohio.' Consult: Hurd (ed.), *History of Worcester County, Mass.* (Philadelphia, 1889); and a chapter in Powell (ed.), *Historic Towns of New England* (New York, 1898).

RUTLAND. The county-seat of Rutland County, Vt., 67 miles south by east of Burlington; on Otter Creek, and on the Delaware and Hudson, the Rutland, and the Burlington and Rutland railroads (Map: Vermont, C 7). Some of the loftiest, most picturesque peaks in the Green Mountains are near. Noteworthy features of Rutland include Memorial Hall, the Public and the H. H. Baxter libraries, House of Correction, United States Government building, and the court-house. The city is primarily important for its extensive marble-quarrying industry, the marble deposits here being among the most pro-

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ductive in the United States. The city has also large scale works, lumber mills, machine shops, boiler and engine works, and manufactories of brick, furniture, cheese, etc. Population, in 1900, 11,499.

Rutland was chartered by New Hampshire in 1761, but not settled until nine years later. Along with the rest of the State, it was claimed for many years by both New Hampshire and New York, and in 1772 the latter re-chartered it as Socialborough. This name, however, seems never to have been used. Till 1804 Rutland was one of the two State capitals, and the State House built here in 1784 is the second oldest building in Vermont. In 1892 Rutland was chartered as a city. Consult Williams, *Centennial Celebration of the Settlement of Rutland* (Rutland, 1870).

RUTLAND, JOHN JAMES MANNERS, Duke of. See MANNERS.

RUT'LEDGE, EDWARD (1749-1800). An American patriot, born at Charleston, S. C. After studying law, first in Charleston and then in London, he was admitted to the bar, and became very prominent as a lawyer. He was a member of the Continental Congress in 1774-77, was one of the signers of the Declaration of Independence, served on the first Board of War in 1776, and in the same year was a joint commissioner with John Adams and Franklin to treat with Lord Howe with regard to peace. He was reëlected to Congress in 1779, but, on account of illness, did not take his seat. He was taken prisoner near Charleston in 1780, and was confined at Saint Augustine for eleven months. From 1798 until his death he was Governor of South Carolina.

RUTLEDGE, JOHN (1739-1800). An American statesman, born at Charleston, S. C. He studied law in London, and began to practice at Charleston in 1761. He sat in the Stamp Act Congress at New York in 1765, in the South Carolina convention in 1774, and the Continental Congress of 1774; was chairman of the committee which framed the new Constitution for South Carolina in 1776, and was first President (1776-98) under that Constitution. In 1779 he was Governor of the State, and during the siege of Charleston was given almost absolute power by the Legislature. On the surrender of the city in 1780 he joined the Army of the South, with which he remained till the end of the war. He was a member of Congress in 1782, and again in 1783, was Chancellor of his State in 1784, member of the convention which framed the Federal Constitution (1787) and of the State convention which adopted it. He was an associate justice of the United States Supreme Court (1789-91), was Chief Justice of South Carolina from 1791 to 1795, and in July, 1795, was appointed Chief Justice of the United States Supreme Court, but, owing to the loss of his reason, the appointment was not confirmed.

RÜTLI, rụt'lê. A meadow in Switzerland. See GRÜTLI.

RU'TULI. An ancient Italian people on the coast of Latium, south of the mouth of the Tiber. In the early legends they appear as hostile to the Latins, but later are found in the Latin League. Their capital was Ardea, which was conquered by the Romans in B.C. 442 and made a Latin colony. In Vergil's *Æneid*, Turnus is their king, and leads them against Æneas and the Trojans, who threaten to supplant him with Latinus, whose daughter he had been promised.

RUVO DI PUGLIA, rōō'vô dê pōō'lyà. A city in the Province of Bari, Italy, 20 miles west of Bari, with which it has steam tramway connection (Map: Italy, L 6). It is surrounded by walls, has a twelfth-century cathedral, a seminary, and a gymnasium. The Apulian tombs in the vicinity have yielded many beautiful vases. The city is famous for its potteries. It trades in grain, pulse, and fruits. Population (commune), in 1881, 17,956; in 1901, 23,776.

RUWENZORI, rōō'wĕn-zō'rê. A mountain mass in Central Africa, on the boundary between the Congo Free State and British East Africa, and between the Albert Nyanza and the Albert Edward Nyanza (Map: Congo Free State, F 2). It consists of several parallel ridges and groups of peaks with altitudes estimated at from 16,000 to 20,000 feet, so that it may prove to be the highest mountain mass in Africa. All the higher summits are capped with perpetual snow, and the whole mass has a very imposing appearance, falling steeply on the west and south into the great fissure which runs through the African plateau. The core of the mountains is of eruptive granite, and the sides are covered with mica-slate. Ruwenzori was discovered in 1888 by the Stanley expedition. In 1901 Wylde reached an altitude of 15,000 feet.

RUY BLAS, rụ'ē' blàs. A drama by Victor Hugo (1838). The hero is the lackey of Don Salluste, who was disgraced by the Queen. His relative, Don César de Bazan, disappears and Ruy Blas is forced to personate him at Court, where he rises to power. Salluste plans a rendezvous to ruin the Queen, but Ruy Blas, who loves her, kills his master and himself to save her honor.

RUYSBROEK, rois'brōōk, or **RUSBROEK,** JAN VAN (1293-1381). A Dutch mystic. He was born at Ruysbroek; studied at Brussels, and became vicar of the Church of Saint Gudule in Brussels, but in 1343 he retired to the Augustinian Monastery of Groenendael, near Waterloo, where he spent the remainder of his life as prior. Here he believed his writing to be under the direct inspiration of the Holy Spirit. From him dates the succession of mystical teachers in Germany and the Netherlands prior to the Reformation. He earned the name of *Ecstatic Teacher*. An edition of his works, which he wrote partly in Flemish and partly in Latin, was published in Hanover in 1848. Consult: Engelhardt, *Richard von Saint Victor und Ruysbroek* (Erlangen, 1838); Schmidt, *Étude sur Ruysbroek* (Strassburg, 1859); and Auger, *De Doctrina et Meritis Joannis de Ruysbroek* (Louvain, 1892).

RUYSCH, rois, RACHEL (1664-1750). A Dutch flower and fruit painter, born in Amsterdam. She was a pupil of Willem van Aelst, married the portrait painter Juriaen Pool in 1695, was received into the guild at The Hague in 1701, and became Court painter to the Elector Palatine in Düsseldorf in 1708. Her reputation as a flower painter was second only to that of Jan van Huysum. She excelled particularly in painting rare exotic flowers and insects. Two admirable pieces (dated 1700 and 1715) are in The Hague Museum, a fine fruit piece and four others in the Pinakothek at Munich, four in

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Amsterdam, and others in Karlsruhe, Berlin, Dresden, Vienna, and New York. She died in Amsterdam.

RUYSDAEL, rois'dàl, or **RUISDAEL**, JACOB (c.1625-82). One of the greatest landscape painters of the Dutch school. He was born at Haarlem and studied under his uncle, Salomon Ruysdael. In 1648 he was received into the guild at Haarlem and in 1659 obtained the rights of citizenship at Amsterdam, where he lived from 1657 to 1681. Although he must have occupied a distinguished position among his fellow artists, as such masters as Berchem, Lingelbach, Philip Wouwerman, and Eglon van der Neer painted the figures in some of his landscapes, he was so little appreciated by his contemporaries that he fell into poverty. His friends of the Mennonite sect, to which he belonged, procured for him, in 1681, admission to the almshouse at Haarlem, where he died in March, 1682.

He was a close observer of nature, which he rendered in its various aspects with rare truthfulness, a powerful and warm coloring, and a mastery of execution ranging from the minutest touch to the broadest treatment. Selecting usually the flat and homely scenery of his native country, with lonely hamlets, water-mills, dark sheets of water overshadowed by trees, while the sky is usually clouded, he imparts a somewhat melancholy character to his landscapes, which are tinged, however, with the poetic charm of repose in nature. Dark masses of foliage make the prevailing tone of his coloring a dark green. Unfortunately, his earlier pictures have darkened so as to have lost much of their charm. He delighted in depicting wide expanses of land or water, especially the surroundings of Haarlem or Amsterdam and the coast of Scheveningen. Of his marine views there are comparatively few. They are characterized by cloudy skies and an agitated sea, and include some of his most successful efforts. Some of his greatest triumphs he won, however, with the representations of hilly and even mountainous scenery, with foaming waterfalls. Among the numerous fine examples in public galleries are an "Oak Forest," "View of Haarlem," and an "Agitated Sea," in the Berlin Museum; "Ford in a Wood," "Castle of Bentheim," "The Hunt" (with accessories by Van de Velde), "The Monastery," and especially the "Jewish Cemetery," of sombre but imposing effect, in the Dresden Gallery. Admirable specimens of his waterfalls are in Munich, Brunswick, Cassel (1682), Amsterdam, The Hague, which also contains a fine view of the "Bleaching Green Near Haarlem," in Antwerp, and in the National Gallery, London, where may also be seen a "Landscape with Ruins" (1673), and several others. A "Storm at Sea," a "Forest" (with cattle and figures by Berchem), and two landscapes, known as "Le buisson" and "Le coup de soleil," are in the Louvre. The Hermitage at Saint Petersburg preserves fourteen of his works, and 130 rare examples are in various private collections in England. Ruysdael also left seven spirited etchings. Consult: Van der Willigen, *Les artistes de Haarlem* (The Hague, 1870); Crowe, *Handbook of Painting* (London, 1874); Wurzbach, in Dohme, *Kunst und Künstler*, ii. (Leipzig, 1878); and Michel, *Jacob van Ruisdael et les paysagistes de l'école de Haarlem* (Paris, 1890).

RUYSDAEL, or **RUISDAEL**, SALOMON (c.1605-70). A Dutch landscape painter, uncle of the preceding, born at Haarlem. In his earlier works he was a close imitator of Jan van Goyen, but later his mannered treatment of foliage and a more powerful color make his pictures more easily distinguishable from those of his master. Among his pictures may be quoted: A "Dutch Canal" (1642), with many figures, and four others (two dated 1631, 1656) in the Berlin Museum; "Village in Flat Country" (1633) and "Fisherman's Cottage Near Canal" (1643), in Dresden; "Canal with Boats" (1642), in Munich; a "River Landscape" (1652), in Copenhagen; "Banks of the Meuse" and "View of Alkmaar," in the Metropolitan Museum, New York; and "Crossing the River," in the Gallery of the Historical Society, New York.

RUYTER, roi'tĕr, MICHAEL ADRIAANSZOON DE (1607-76). A Dutch admiral, born at Flushing. He went to sea as a boy and rose to be captain of a vessel employed by the Flushing merchants for the protection of their commerce in the British Channel (1637). In 1641 he was made rear-admiral of a squadron dispatched by Holland to the aid of the Portuguese against the Spaniards and distinguished himself in a battle which was fought near Cape Saint Vincent, November 3d. In 1647 he rendered effective service against the Barbary pirates. When war between Holland and England broke out in 1652 Ruyter was placed in command of a fleet of some 35 ships and on August 26th fought a drawn battle with Sir George Ayscue off Plymouth. He was under Maarten Tromp when the latter defeated Blake in the Channel (December 10th), and participated in the three days' battle with Blake near Portland (February 28-March 2, 1653). After the peace of 1654 he cruised in the Mediterranean and captured several Turkish ships. In 1659 he was dispatched to aid the King of Denmark against Sweden and for his services was ennobled. In the second war against the English, Ruyter received the chief command. In June, 1666, Ruyter and Cornelis van Tromp, with 90 sails, engaged the English fleet under Prince Rupert and the Duke of Albemarle. Both sides fought with such obstinacy that the battle lasted four days, ending in a partial victory for the Dutch. The conflict was renewed in July, when the British gained a complete victory, destroying above 20 of Ruyter's men-of-war. In 1667 Ruyter ravaged the English shipping at Sheerness, sailed up the Medway as far as Chatham, burned several English men-or-war, and effected more toward the conclusion of peace at Breda (1667) than any diplomatist. In 1672 he commanded the Dutch fleet and fought several battles with the combined English and French fleets, but without decisive results. In 1675 he was sent to the Mediterranean to coöperate with the Spanish fleet against the French. He fought a drawn battle with the French under Duquesne off Stromboli (January 8, 1676), but was defeated near Mersena, off the east coast of Sicily (April 21st). He made good his retreat into the harbor of Syracuse. His legs, however, were shattered in the engagement and he died April 29th. Consult: Liefde, *The Great Dutch Admirals* (London, 1873); Grinnel-Milne, *Life of Lieutenant Admiral de Ruyter* (London, 1896).

RY'AN ABRAM JOSEPH, best known as 'Father Ryan' (1839-86). An American Roman Catholic priest, probably the most conspicuous poet of the Southern Confederacy. Shortly after

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ordination Ryan became chaplain in the Confederate Army, served to the close of the war, and wrote not long after Lee's surrender his famous poem, "The Conquered Banner." He then served in New Orleans as priest and editor of the *Star*, a Roman Catholic weekly; founded in Augusta, Ga., the *Banner of the South*, a religious and political weekly; then he reassumed priestly duties in Mobile, till 1880, when he visited the North to lecture and published in Baltimore *Poems, Patriotic, Religious, and Miscellaneous*, among which the most popular, besides "The Conquered Banner," is "The Sword of Lee."

RYAN, PATRICK JOHN (1831—). A prelate of the Roman Catholic Church, born at Cloneyharp, Ireland. He was educated at the Christian Brothers' School at Thurles and at Carlow College. He came to the United States in 1853 and began teaching in the Theological Seminary at Saint Louis, Mo. The same year he was ordained priest, and soon became rector of the cathedral. In 1860 he became pastor of the Church of the Annunciation and in 1868 of Saint John the Evangelist's Church and vicar-general of the diocese, in 1872 coadjutor bishop of Saint Louis, and in 1894 archbishop of Philadelphia. He was one of the leading pulpit orators of the Roman Catholic Church. Among his published addresses are *What Catholics Do Not Believe* (1877) and *Some of the Causes of Modern Religious Skepticism* (1883).

RYAZAN, ryä-zän'y', or **RIAZAN.** A government of Central Russia, bounded by the Government of Vladimir on the north, Tambov on the east and south, and Tula and Moscow on the west (Map: Russia, E 4). Area, 16,261 square miles. It is divided by the valley of the Oka into two parts, of which the northern is low, marshy, and thickly wooded, and the southern is slightly elevated, sparsely wooded, and has a rich black soil. Ryazan contains deposits of iron, coal, and various clays, of which iron is mined to a considerable extent. Agriculture, the principal occupation, is greatly hampered by the inadequate size of the peasants' holdings. Rye and oats are the principal cereals raised for export. Stock-raising is in a state of decline. The house industry is but little developed, yet the manufacturing industries are making some progress and the annual value of the manufactures now exceeds $11,000,000, principally cotton goods and flour. Population, 1897, 1,827,085, consisting principally of Great Russians. Ryazan was one of the mediæval principalities of Russia, which was annexed to Moscow in 1517.

RYAZAN, or **RIAZAN.** The capital of the government of the same name in Central Russia, near the confluence of the Trubezh with the Oka, 123 miles southeast of Moscow. It is a picturesque place with a number of ancient churches. Ryazan manufactures candles, tallow, and spirits, and has a considerable trade in grain, wood, animals, and salt. It was the capital of the mediæval Principality of Ryazan. Population, in 1897, 44,552.

RYAZHSK'. An important railway centre in the Government of Ryazan, Russia, situated 70 miles south of Ryazan. It has an extensive trade in grain. Population, in 1897, 12,993.

RYBINSK, rĭ'bĭnsk. A river port in the Government of Yaroslav, Russia, on the Volga, near its confluence with the Sheksna and the Tcheremakha, about 228 miles north-northeast of Moscow (Map: Russia, E 3). It is well built and is of great commercial importance, an immense amount of freight carried on the Volga and the canals connecting that river with the Baltic and the White seas being handled here. Of late its trade has been falling off, owing to railway competition. The chief manufactured product is flour. Population, in 1897, 25,200. There is a vast influx of people during the season of navigation.

RYDBERG, ryd'bär-y', VIKTOR (1829-95). A Swedish author, born in Jönköping and educated at Lund. In 1854 he became an editor in Göteborg, and in 1876 professor of the history of civilization in the university of Göteborg, whence in 1884 he went to Stockholm in a similar capacity. Two volumes of lyrics (1882 and 1891) show unusual poetic form and originality of thought; but his historical novels are his real claim to fame. The best known are *Frybytaren pa Oestersjön* (1857); *Singoalla* (1865); *Vapensmeden* (1891); and *Den siste athenaren* (1859), the last mentioned, which was translated into English (1883), being the most powerful. Consult: Schenck's biography (Marburg, 1896); and Zachrisson, *Rydberg som uppfostrare* (Göteborg, 1897).

RYDE, rĭd. A fashionable watering-place and market-town on the north coast of the Isle of Wight, England, five miles south-southwest of Portsmouth (Map: England, E 6). It consists of Upper and Lower Ryde, the former anciently called *Rye*, or *La Riche*, and the latter of modern construction. The shores are wooded, and the appearance of the town is pleasing. The pier, nearly a mile long, forms an excellent promenade. Yacht and boat building is carried on to some extent. Ryde is the largest town in the island. It was incorporated in 1868. Population, in 1891, 10,952; in 1901, 11,042.

RY'DER, ALBERT PINKHAM (1847—). An American landscape and figure painter, born in New Bedford, Mass. His earlier landscape works include: "Spring," "Lowlands, Near Highbridge," and "The Forest of Arden." Later he painted figures chiefly. His subjects, sometimes from Shakespeare or Wagner, are idealistic and imaginative. They are to be regarded for general effect rather than detail, and are often painted in an unusual color scheme. Such pictures include "Siegfried," "Jonah," and "The Flying Dutchman."

RYDER, WILLIAM HENRY (1822-88). An American Universalist clergyman, born at Provincetown, Mass. After preaching at Concord, N. H., Nashua, N. H., and Roxbury, Mass., in 1860 he became pastor of Saint Paul's Church, Chicago, and remained there until his death. He left bequests amounting to over $500,000 to charitable and educational institutions, and also founded a free lecture course "in aid of the moral and social welfare of the citizens of Chicago, upon an unsectarian basis."

RYE (AS. *ryge*, OHG. *rocco*, Ger. *Rocken*, *Roggen*, rye; connected with OPruss. *rugis*, Lith. *rugys*, Lett. *rudzi*, OChurch Slav. *rŭzdĭ*, rye). Several species of the genus Secale, native to western temperate Asia and adjacent Europe. Common rye (*Secale cereale*), the only species in cultivation, does not seem to have been grown so long ago as the other common cereals, as it

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has not been found in Egyptian monuments, and has no name in ancient languages. Its cultivation was known to the Romans in Pliny's time, but not to the ancient Greeks. Rye is extensively cultivated in Northern Europe, in some parts of Asia, and to some extent in North America. It does not grow as far north as barley, but succeeds in regions too cold for wheat and on soils too poor for any other grain. It will ripen in colder latitudes than most other grains, but is most productive where wheat will ripen. It is adapted to light, sandy lands, and does not thrive well on heavy, damp, humous soils. The varieties of rye, much less numerous than those of the other important cereals, may be classified into winter and spring varieties. The former, which are most frequently grown, are sown in autumn, the latter in spring. Cultural management is much the same as for other cereals. Winter rye is usually ripe in June. Rye is also frequently grown for green manuring on lands deficient in humus. A good crop of rye yields from 20 to 30 bushels of grain per acre. Russia is the greatest rye-producing country in the world, producing on 37 per cent. of her total acreage of tillable land about 700,000,000 bushels annually. The annual production of rye in the United States is about 24,000,000 bushels, with an average yield of about 14 bushels per acre. See Colored Plate of CEREALS.

FOOD AND FEEDING VALUE. In Europe rye ranks next to wheat as a breadstuff, but since its flour is darker than that of wheat and since the gluten of rye flour does not possess the same elastic and tenacious quality as that of wheat, rye bread is darker and more compact than wheat bread. When the grain is milled entire—the usual way—it contains more protein than wheat flour. Mixtures of wheat and rye flour and corn and rye are often made for bread-making. Rye bread has the following average percentage composition: Water, 35.7; protein, 9.0; fat, 0.6; nitrogen-free extract, 52.7; crude fibre, 0.5; and ash, 1.5. The fuel value is 11.80 calories per pound. The 'black bread' of Europe is made of rye, an especially dark form being known in North Germany as 'pumpernickel.'

The various rye products have the following percentage composition:

AVERAGE PERCENTAGE COMPOSITION OF RYE PRODUCTS.

	Water	Protein	Fat	Nitrogen free extract	Crude fibre	Ash
	Per ct.	*Per ct.*	*Per ct.*	*Per ct.*	*Per ct.*	*Per ct.*
Rye, whole grain	11.6	10.6	1.7	72.5	1.7	1.9
Rye, flour	13.1	6.7	0.8	78.3	0.4	0.7
Rye, bran	11.6	14.7	2.8	63.8	3.5	3.6
Rye, shorts	9.3	18.0	2.8	59.9	5.1	5.9
Rye, fodder	76.6	2.6	0.6	6.8	11.6	1.8
Rye, hay	8.5	9.8	2.3	43.4	30.1	5.9

As regards composition, the rye grain does not differ materially from wheat. It has been urged that, as rye is often affected with ergot, it is not a wholesome food for animals. This objection cannot be urged of clean rye, and the fact that it has been so long used as food by man without harmful results indicates that there is nothing in the grain itself which would render it harmful.

RYE. A small seaport town of Sussex, England, one of the Cinque Ports (q.v.).

RYE. A town in Westchester County, New York, eight miles northeast of New Rochelle; on the New York, New Haven and Hartford Railroad (Map: New York, G 5). It includes the manufacturing village of Port Chester (q.v.). Rye Beach, on Long Island Sound, has some reputation as a summer resort. Population, in 1890, 9477; in 1900, 12,861. Rye was settled in 1660 and was organized as a town under the jurisdiction of Connecticut in 1665. The boundary line at this point between Connecticut and New York was long disputed, and Rye was included within the limits of the former until 1683, and again from 1697 to 1700. The Jay homestead is in Rye, and John Jay spent his early life here. Consult Baird, *Chronicle of a Border Town, History of Rye* (New York, 1871).

RYE-GRASS (*Lolium*). A genus of grasses, having a two-rowed, flatly compressed spike, the spikelets appressed edgewise to the rachis. Common rye-grass, ray-grass, or perennial rye-grass (*Lolium perenne*), is frequent in meadows and pastures, and is highly valued in Europe, where it is the most popular grass for forage and hay. In North America it is less esteemed than timothy for either pasture or hay. It succeeds well on poor soils. Of the numerous varieties common perennial rye-grass is most generally cultivated. A form called annual rye-grass—not really an annual plant, although useful for only one year—is sometimes cultivated, but is in almost every respect inferior. Italian rye-grass (*Lolium multiflorum*) is much esteemed as a forage and hay grass in Southern Europe, where it is native, and in the Eastern United States. It is preferred by cattle to common rye-grass. The young leaves are folded up, while those of the common rye-grass are rolled together. In the United States this species is especially esteemed in the East. It grows rapidly, forms a dense turf, and upon good soils yields several cuttings in a season. It is readily distinguished from all forms of perennial rye-grass by its awned or bearded spikelets.

RYE HOUSE PLOT. A conspiracy in 1683, among extremists of the Whig Party, to waylay and assassinate King Charles II. of England on his return from Newmarket, at a house called the Rye House farm, whence the plot got its name. It was frustrated and discovered owing to the fact that the house which the King occupied at Newmarket took fire accidentally and the King in consequence left the place eight days sooner than was expected. The indignation excited by the Rye House plot was taken advantage of by the Royalists to implicate the whole Whig Party, and among those who suffered death for alleged complicity were Lord William Russell and Algernon Sidney (qq.v.).

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RY'ERSON, ADOLPHUS EGERTON (1803-82). The founder of Ontario's public school system. He was born in Charlotteville, Upper Canada, received a good education, and became a Methodist minister. In 1829 he was chiefly instrumental in founding and became the editor of the *Christian Guardian*, the religious organ of Canadian Methodism. He also took the leading part in founding the Upper Canada Academy at Cobourg, afterwards chartered as Victoria University, of which he was the first president. In 1844 he was appointed Superintendent of Education for Upper Canada, and from that year until 1876, when he resigned, he was the guiding and controlling force in establishing the school system of that province, now the Province of Ontario. He visited Europe to study the different educational systems, and drafted legislative measures, afterwards enacted into laws, embodying their best features. His publications include: *Letters in Defense of Our School System* (1859); *The Loyalists of America and Their Times* (1880); and *The Story of My Life*, an autobiography unfinished at his death, but subsequently completed and published by Dr. John George Hodgins (1883).

RYEZHITSA, ryĕ'zhĭt-sä. A town in the Government of Vitebsk, Russia, situated about 65 miles northeast of Dünaburg (Map: Russia, C 3). Population, in 1897, 10,681.

RYLE, rĭl, JOHN CHARLES (1816-1900). An English clergyman, Bishop of Liverpool. He was born near Macclesfield, and educated at Eton and at Christ Church, Oxford. He took orders in 1841, and was appointed successively curate at Exbury, rector of Saint Thomas's, Winchester, in 1843, rector of Helmingham in 1844, vicar of Stradbroke in 1861, rural dean of Hoxne in 1869, and honorary canon of Norwich in 1871. In 1880 he was appointed by Lord Beaconsfield Dean of Salisbury, but before entering upon his duties he was appointed Bishop of Liverpool by the same statesman. He was numbered among the 'evangelicals' of the Church of England, and his work among the poorer classes of the west of England was of an aggressive and helpful character. His works include: *The Bishop, the Pastor, and the Preacher* (1854), sketches of Latimer, Baxter, and Whitefield; *Bishops and Clergy of Other Days* (1868), lives of Hooper, Latimer, Ward, Baxter, and Gurnall; *The Christian Leaders of the Last Century* (1869); *Principles for Churchmen* (1884); *Many Points of View* (1886); *Is All Scripture Inspired?* (1898).

RYLEYEFF, rĭ-lä'yĕf, KONDRATIY FEODOROVITCH (1795-1826). A Russian lyric poet, who was one of the leaders of the Decembrists, and died on the scaffold. His fearless attack on the all-powerful Araktcheyeff (q.v.), in *The Minion* (1820), made him famous. A collection of his lyrics, *Dumy* (Meditations), and the epics, *Nalivayko's Confessions* and *Voynarovski's Dream*, assign to him a rank next to that of his friend Pushkin. With Bestuzheff he edited in 1823-25 the literary almanac, *The Polar Star*, to which Pushkin liberally contributed. His works were last edited by M. N. Mazayeff (Saint Petersburg, 1893).

RYLSK, rĭl'y'sk. A town in the Government of Kursk, Russia, situated at the confluence of the Rylo with the Seim, 84 miles southeast of Kursk (Map: Russia, E 4). It manufactures oil and trades in grain and agricultural implements. During the twelfth and thirteenth centuries it was the capital of the independent Principality of Rylsk, which was annexed to Lithuania in the beginning of the fourteenth century, and to Moscow in 1500. Population, in 1897, 11,415.

RY'MER, THOMAS (1641-1713). An English critic, poet, and historian, born in Yafforth, Yorkshire, and educated at Sidney-Sussex College, Cambridge. He was called to the bar in 1673, but devoted himself mostly to literature. Of his poems, the best known are those in memory of Waller. Both his poetry and his criticism, which is chiefly dramatic and attacks Shakespeare for failing to preserve the unities, were highly praised by Pope and fiercely ridiculed by Macaulay. In 1692 he succeeded Shadwell as Court historiographer; but in this province his only important publication was the Latin compilation of English treatises under the title *Fœdera* (1704-35). Of this a *Syllabus* by Sir Thomas Duffus Hardy appeared in 1869 et seq.

RYSWICK, rĭz'wĭk, PEACE OF. A treaty concluded between France and Great Britain, Spain, and Holland, September 20, 1697, ending nine years of war between Louis XIV. and the Grand Alliance. A congress of envoys from Austria, Denmark, England, Holland, the German States, Spain, and France had been in session through the summer of that year. France agreed to restore to Spain places in Catalonia and the Netherlands, and to recognize William III. as King of England. Charles IV., Duke of Lorraine, was placed in possession of his States. In America and the East Indies all conquests were to be restored. Indeed, so far as territory was concerned, the general result was a return to the *status quo ante*. In a supplementary treaty, signed October 20, 1697, by the Emperor, considerable restitutions were made to the German States by France. The chief result of the war, as determined by the peace, was the check given to the overweening ambition of Louis XIV., whose power from this time underwent a steady decline. The village of Ryswick (Dutch *Rijswijk*) is in the outskirts of The Hague. Consult Neuhaus, *Der Friede von Ryswick* (Freiburg im Breisgau, 1874).

RZESZÓW, rzhĕ'shŭv. A town in the Crownland of Galicia, Austria, 98 miles by rail east of Cracow (Map: Austria, H 1). Its principal buildings are the castle of Prince Lubomirski and the Cloister of Saint Bernard. Linen-weaving and the manufacture of gold wares, leather, bone-dust, and pipes are carried on. The town is a famous horse mart. Population, in 1890, 11,953; in 1900, 14,714, mostly Poles.

RZHEV, rzhĕv. A river port of the Government of Tver, Russia, situated on the Volga, 112 miles southwest of Tver. It has a considerable flax-spinning industry, and carries on a trade in grain. Population, in 1897, 21,390, of whom about half were Dissenters.

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S

S The nineteenth letter of the English alphabet. The name for its Semitic equivalent was *shin*, tooth, the letter-form roughly representing a toothed edge. The development of the letter was as follows:

W	Ϛ	Σ	ʃ	ʃ
Phœnician	Early Greek	Later Greek	Early Latin	Later Latin

In its usual phonetic sound *s* is the breathed alveolar spirant. In the formation of this sound the tongue, which is raised and approximates the upper tooth-sockets, is grooved longitudinally, and the air passes through this narrow channel with a hissing sound, whence *s* is called a sibilant. The result is the *s* in *sing, mast*. The same sound is represented by *c* (before *e, i, y*) in *cent, face, cynic;* and by *sc* in *science, coalesce*. *S* has the phonetic value of *z* after a sonant at the end of a word and also between sonants, as *flies, rise, busy, nose;* of *sh* (before consonantal *i*, and rarely *u*), as *passion, mansion, sure, sugar;* of *zh* in *measure, osier, treasure*. The digraph *sh* is a sibilant formed in much the same manner as *s*. The tongue-tip, however, is turned upward rather than forward, and the sound is more palatal, as in *shadow, sad; shall, salt*. This *sh* sound is an extremely common one, whether represented by *ch*, as in *chaise, machine*, or by other combinations: *Asia, social, conscious, ocean, vitiate*.

English *s* is derived from various sources. It represents original Indo-Germanic *s* in *self*, Skt. *sva*, Lat. *se*, Goth. *sik;* Skt. *haṁsa*, Gk. χήν, Lat. *anser*, Eng. *goose*. In words of Latin origin it represents Indo-Germanic *d* + *t* or *t* + *t*: *risible*, Lat. *risus*, from **rid-tus; reverse*, Lat. *vertus*, from **vert-tus*. *S* represents French-Latin *s* and *ti; s* in *saint, usage; ti* in *ransom*, from Lat. *redemptionem; silence*, from Lat. *silentium*.

As a mediæval Roman numeral S = 7 or 70, S̆ = 70,000. In chemistry S stands for sulphur. As abbreviation S. stands for *south;* s. for *second, shilling;* S.S. for steamship, Sunday school. S. stands for science in B. S., Bachelor of Science, and society, in F. R. S., Fellow of the Royal Society.

SAADIA (sȧ-ä′dê-ȧ) **BEN JOSEPH** (892-942). A distinguished Jewish philosopher and exegete. He was born in the Fayum, Egypt. At an early age he made a translation of the Bible into Arabic, with notes, intended to serve as an attack upon the doctrines of the Karaites (see JEWISH SECTS), against whom he had previously written a work, *In Refutation of Anan*. Through his efforts largely the spread of the Karaite movement, which threatened at one time to subvert Rabbinical Judaism, was checked. By 928 his fame had spread beyond the borders of Egypt, and he was called to the head of the Rabbinical school at Sura in Babylonia. Owing to a disagreement with the "Prince of the Captivity," the head of the Babylonian Jews, he lost his office, and went into retirement (933), and during this period wrote in Arabic a philosophical work, *Faiths and Doctrines* (translated into Hebrew by Judah ben Tibbon). Saadia also wrote commentaries on the Bible and many poems, which are at present used in the Jewish liturgy. His works have been published by Derenbourg and Lambert, vols. i., iii., v., vi., and ix. having already appeared. Saadia ranks next to Maimonides among Jewish philosophers, while he surpasses the latter in the thoroughness of his Biblical and Talmudical scholarship. Consult Winter and Wünsche, *Jüdische Litteratur*, vol. ii., pp. 28-40 (Trier, 1894).

SAALE, zä′le. A river of Germany. It rises in the Fichtelgebirge, in Bavaria, and flowing northward through some of the Thuringian States, and finally across the Prussian Province of Saxony, falls into the Elbe, about 25 miles above Magdeburg, after a course of 226 miles (Map: Prussia, D 3). It is navigable 103 miles by means of 17 locks.

SAALFELD, zäl′fĕlt. A town in the Duchy of Saxe-Meiningen, Germany, situated on the left bank of the Saale, 87 miles by rail southwest of Leipzig (Map: Germany, D 3). It is an old town with an interesting Gothic church of the thirteenth century, a castle of the seventeenth century, a Gothic town hall, dating from 1537, and the ruins of the Sorbenburg, a castle believed to have been built by Charlemagne as a fortress against the Sorbs. The town manufactures various kinds of machinery, paints, knit goods, etc. Population, in 1900, 11,681. It was probably founded during the reign of Charlemagne.

SAAR, zär (Fr. *Sarre*). A river of Southwestern Germany. It rises in the Vosges Mountains on the boundary of Alsace, and flows northwest though Lorraine and the Prussian Rhine Province, emptying into the Moselle a few miles above Treves (Map: Germany, B 4). It is 152 miles long, navigable 54 miles to Saar-

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brücken, and by means of a system of locks 20 miles farther to Saargemünd. The Saar Canal connects its middle course with the Rhine-Marne Canal.

SAAR, FERDINAND VON (1833—). An Austrian poet and novelist, born in Vienna. He entered the army in 1849, and, retiring after the Italian campaign of 1859, devoted himself entirely to literature. In 1902 he was made a member of the House of Peers. As a lyric poet of decided individuality he made his mark with *Gedichte* (1882). Equally striking are his *Wiener Elegien* (1893). His stories, *Novellen aus Oesterreich* (2d ed. 1894), *Schicksale* (1889), *Frauenbilder* (1892), *Herbstreigen* (1897), and *Camera Obscura* (1901), depict Vienna society with rare power of analysis. His dramatic works are less valuable.

SAARBRÜCKEN, zär'bruk-*en*. A town in the Rhine Province, Prussia, on the Saar, 50 miles east by north of Metz (Map: Prussia, B 4). It is connected with the opposite town of Sankt Johann by two bridges, has an old castle, a town hall with frescoes by Werner, a fine new statue of Bismarck, and a gymnasium. The town is the centre of a coal-mining district, which produces annually over 7,000,000 tons of coal. Its manufactures include woolen and linen fabrics, hardware, Berlin blue, tin and zinc wares, glass, leather, and tapestry. Saarbrücken, originally a possession of the counts of Ardennes, fell to Nassau in 1381. It was garrisoned by France from 1801 to 1815, when it came to Prussia. Saarbrücken was the scene of the opening engagement in the Franco-Prussian War of 1870-71. A French army corps, under Napoleon III., captured the town on August 2, 1870, but was forced to retreat on August 6th. Population, in 1890, 13,812; in 1900, 23,242.

SAARBURG, zär'bōōrk. A town of Alsace-Lorraine, Germany, on the Saar, 44 miles by rail northwest of Strassburg. (Map: Germany, B 4). It is surrounded by walls and strongly garrisoned. Gloves, lace, beer, and watch-springs are manufactured. Population, in 1900, 9,178.

SAARDAM, sär'dȧm. A town of the Netherlands. See ZAANDAM.

SAARGEMÜND, zär'*ge*-mụnt' (Fr. *Sarreguemines*). A town in the Province of Alsace-Lorraine, Germany, situated at the confluence of the Blies and the Saar, 40 miles east of Metz (Map: Germany, B 4). It has a gymnasium, and manufactures pottery, hempen fabrics, silks, velvets, etc. Population, in 1900, 14,680.

SAARLOUIS, zär'lōō'ē. A town in the Rhine Province, Prussia, on the Saar, near the French frontier, and 31 miles southeast of Treves (Map: Germany B 4). Its fortifications were built by Vauban in 1680-85 during the reign of Louis XIV. They are now comparatively unimportant, and are used as barracks and depots. In the vicinity are lead and iron mines, and the town has manufactures of leather, wire, and firearms. Population, in 1900, 7,864.

SAAVEDRA, sä'ȧ-vā'drȧ, ANGEL DE, Duke de Rivas (1791-1865). A Spanish statesman and author, born in Cordoba. After eight years' service in the army he devoted himself to literary studies, and had written *Ensayos poéticos* (1813) and several tragedies before the revolution of 1820, in which he took so prominent a part that from 1823 to 1834 he was forced to live in exile. In 1834 he returned to Spain, and in 1836 he became Minister of the Interior. The revolutionary rising of that year drove him again into exile. In 1844 he became Ambassador to Naples, in 1855 he was sent to France, and in 1860 to Florence. Among his works are *Florinda* (1824-25), an epic of the Moorish conquest; *El Moro exposito* (1834), also an epic; histories of the Neapolitan revolution (1848; revised, 1881) and of Masaniello (1860); and many romances and some excellent plays. His complete works were edited by his son in the Castilian *Colección* (1895).

SAAZ, zäts (Bohemian *Žatec*). A town in the Crownland of Bohemia, Austria, on the Eger, 43 miles northwest of Prague (Map: Austria, C 1). It is the centre of the Bohemian hop industry. The town has an institute for instruction in hop-growing and preparing, and gives annual prizes for excellence in this line. There are manufactures of machinery, leather, and sugar. The population in 1890 was 13,234; in 1900, 16,168, mostly Germans.

SABA, sä'bȧ. An island of the Dutch West Indies belonging to the Colony of Curaçao, and situated among the Leeward Islands, 26 miles southwest of Saint Martin Island (Map: West Indies, Q 6). Area, 5 square miles. It is a circular volcanic peak rising 2817 feet above the sea. Cotton and indigo are produced. Population, in 1900, 2177.

SABADELL, sä'bȧ-dȧl'y'. A town of Northeastern Spain, in the Province of Barcelona, situated on the Barcelona-Saragossa Railroad 11 miles northwest of the former city (Map: Spain, G 2). It is an important manufacturing centre, about half of its population being employed in its textile mills. The town has a college. Population, in 1887, 19,645; in 1900, 23,375.

SAB'ADIL'LA (Sp. *cevadilla, cedabilla,* diminutive of *cevada, cebaba,* barley, from *cebar,* Lat. *cibare,* to feed, from *cibus,* food), CEBADILLA, or CEVADILLA (*Asagræa officinalis,* or *Schenocaulon officinalis*). A Mexican plant of the natural order Liliaceæ whose winged wrinkled seeds have been employed in medicine like white hellebore (*Veratrum album*) since the sixteenth century and have been considered irritant, sedative, and rubefacient.

SABÆ'ANS. The name of an ancient people of Southern Arabia. Information concerning this people is derived from three sources: (1) Certain notices in the Old Testament. In Gen. x. three pedigrees are given for Sheba (or Saba), the eponymous ancestor of the Sabæans, but it is clear that Sheba belongs to Southern Arabia. The visit of the Queen of Sheba to Solomon (I. Kings x.) is by many thought to be legendary, but even if so, it indicates the importance which the kingdom of the Sabæans had acquired at an early date. References in Isaiah, Jeremiah, Ezekiel, and Job point to the commercial activity of the Sabæans. (2) Classical writers, especially Pliny, represent the people of Yemen (which they use as a general name for Southern Arabia) as wealthy, widely extended, and enterprising, of fine stature and noble bearing, particularly distinguished as merchants; the chief articles of their merchandise were gold, perfumes, spice, incense, and

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precious stones. The wealth and luxury of the Sabæans, however, are exaggerated by the classical writers and many of the stories related are fanciful. (3) Much more reliable information is now available from inscriptions and coins found in large numbers in Southern Arabia during the last century by travelers such as Wellsted, Osiander, Halévy, and Glaser, and deciphered by the labors of D. H. Müller, H. Derenbourg, Prätorius, Hommel, Mordtmann, Winckler, Schlumburger, and others. The cuneiform inscriptions also have shed some light on early Sabæan history.

The dated inscriptions do not appear to be earlier than the sixth century B.C., but the beginnings of the Sabæan kingdom may be carried back several centuries. It is clear in the first place that Saba was the name of a nation that gradually extended its rule from Marib or Maryab as a centre until it embraced practically all of Yemen. The height of its power appears to have been reached in the fifth century; some centuries later we find several independent kingdoms sharing Southern Arabia between them. The political control does not appear to have been vested in a single family, but in a number of distinguished families; hence we find several 'kings' of Saba ruling contemporaneously. The great families of the land possessed towers and castles, the building of which is the subject of many inscriptions. The Sabæans became the natural intermediaries between Egypt and India, since the land route from Egypt to the distant East lay through Yemen. The inscriptions frequently refer to the commercial side of Sabæan history and the chief articles dealt with are gold, precious stones, perfumes of various kinds, horses, and camels. The general state of society bore some resemblance to that of Europe in feudal times. A notable feature was the high position occupied by women, and while no 'queens' have been as yet encountered in the inscriptions, we find a woman described as mistress of a castle, and in many cases women are joint authors with men of the dedicatory or votive inscriptions or are encountered as the sole authors. The number of gods mentioned in the inscriptions is considerable, chief among them Al-Wakkih Ta'lah Athtar and Raḥman. While originally personifications of the phenomena of nature, they became abstractions somewhat like the gods of Egypt, and a number of them are conceived as having several forms. Magnificent temples were erected and gifts and sacrifices were lavished on the gods. Pilgrimages at regular intervals were customary.

The *Sabæan language* was Semitic, showing the strongest affiliation with the Arabic and Ethiopic, though in its syntax it sometimes approached closer to the Hebrew and in certain of its morphological features to the Aramaic. The characters are alphabetic and in many respects more archaic than the Phœnician; the theory is gaining favor that the Phœnicians did not invent the alphabet, but borrowed it from South Arabia. For bibliography, see the article MINÆANS.

SABANILLA, sä'bä-nē'lyä, or **SAVANILLA**. A seaport in the Province of Bolívar, Colombia, the maritime outlet of Barranquilla, with which it has railway connection (Map: Colombia, C 1).

SABATIER, sä'bä'tyā', LOUIS AUGUSTE (1839-1901). A French Protestant theologian, born at Vallon (Ardèche), and educated at Montauban, and at several German universities. From 1869 to 1877 he was professor of theology at the University of Strassburg, and afterwards for several years professor at the Sorbonne. He became known as a representative of liberal theology. His printed works include *Le témoignage de Jésus-Christ sur sa personne* (1863); *Essai sur les sources de la vie de Jésus* (1866); *Mémoire sur la notion hébraique de l'esprit* (1879); *De l'origine du péché dans la théologie de l'apôtre Paul* (1887); *De la vie intime des dogmes et de leur puissance d'évolution* (1890); *Essai d'une théorie critique de la connaissance religieuse* (1893); *Essai sur l'immortalité* (1895); *L'apôtre Paul* (3d ed. 1896); *Esquisse d'une philosophie de la religion* (1897). A memoir appeared in Paris in 1901.

SABATIER, PAUL (1858—). A French theologian and historian, born at Saint-Michel-de-Chabrillanoux (Ardèche). He studied in the theological faculty of the University of Paris, became vicar of the French parish of Saint-Nicolas at Strassburg, and afterwards pastor there of Saint-Cierge-la-Serre. His health compelled him to withdraw from active ministerial duties. His publications include learned editions of the *Speculum Perfectionis seu Francisci Assisiensis Legenda Antiquissima, Auctore Fratre Leone* (1898) and Bartholus's *Tractatus de Indulgentia* (1900); *La Didaché, ou l'enseignement des douze apôtres* (1885), with the Greek text and a commentary; and *La vie de Saint François d'Assise* (1893), based on previously unused documentary sources, discovered by him in various local Italian archives. This work was widely read and several times translated.

SABA'ZIUS (Lat., from Gk. Σαβάζιος). A Thraco-Phrygian nature-god. He originally typified the powers of nature in their vivifying aspect, and the yearly renewal of life. His worship was therefore closely associated with the cults of Cybele (q.v.) and Attis (q.v.), and was orgiastic in character, later degenerating into sexual excesses. Sabazius was represented as horned, and had for his symbol a snake, which typified by the shedding of its skin the renewal of nature (see NATURE-WORSHIP, section *Zoölatry*). The worship of this god was introduced into Athens as early as the fifth century B.C., but by the time of Demosthenes the more cultured classes stood aloof from it. From Greece it was carried to Rome. Here, together with other Oriental cults, it became widespread, especially during the decadence of paganism. In Greco-Roman mythology Sabazius was identified with Dionysus, or occasionally with Zeus. He was further regarded as the son of Zeus and Persephone, and was said to have been destroyed by the Titans. Consult Lenormant, *Sabazius* (Paris, 1875).

SABBATH (Heb. *shabbāth, shabbāthōn*, from *shābath*, to desist, cease). The Old Testament designation for the seventh day of the week, set aside as a period of cessation from work, and one of the most important religious institutions provided for in the Pentateuchal codes. Besides the stipulation for the observance of the Sabbath in these codes, there are important allusions to it in the historical and prophetical books. In both Decalogues (Ex. xx., 8-11, Deut. v., 12-15; see DECALOGUE), the ordinance to cease from all

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labor is enjoined as the fourth 'word' or commandment, and the obligation is extended to all the members of the household, including man and maid servants, and also to ox and ass, all cattle, and to the non-Hebrew dwelling in a Hebrew community. But whereas, in the earlier codes (see HEXATEUCH), the Sabbath (generally associated with the new moon celebration) marks a cessation from the ordinary labor, it did not prior to the Babylonian exile involve a strict prohibition of all secular occupations. It was permitted, e. g. to undertake a journey on the Sabbath day (II. Kings iv. 22-23). Its character as a sacred day sanctified for all times by Yahweh leads the 'Holiness Code' (Lev. xvii. to xxvi.) to lay special stress upon this 'sanctified' character, and the outcome of this movement is to connect the institution with the creation of the world. This step is distinctly taken in the Priestly narrative (Gen. ii. 3), Yahweh setting the example to mankind by Himself 'resting' on the seventh day after finishing the work of creation. Released from its association with the new moon, the regulations for the Sabbath increased in number and severity until the obligation to 'rest' was made to include the prohibition of almost everything requiring physical effort. The rabbis vied with one another in carrying out the comparatively few and simple regulations of the Pentateuchal codes to their last consequences. Thus the ordinance not to kindle fires on the Sabbath day (Ex. xxxv. 3) was interpreted to include the prohibition of cooking meals on the Sabbath day, while the injunction "let no man go out of his place on the seventh day" (Ex. xvi. 29) led to restrictions upon walking beyond a certain distance. The cessation from labor was made to embrace a strict avoidance of handling money, no matter for what purpose, and while public amusements were not prohibited, the Sabbath restrictions made such amusements practically impossible. In this way the Sabbath acquired an austere character, at least in appearance, which was relieved only by the intensity of the religious spirit with which the Jews entered upon the ritual prescribed for the day, and by the opportunity it afforded for family reunions, which became one of the features of the day. From Judaism the institution passed on to Christianity with a change of the day from the seventh to the first day of the week, as commemorating the resurrection of Jesus. See SUNDAY.

Considerable speculation has been indulged in as to the origin of the Hebrew Sabbath. In cuneiform syllabaries a word *shabattum* has been found, which is explained in one instance as 'the day of rest for the heart.' This phrase, however, does not refer to cessation from labors, but to the 'cessation' of the divine wrath. In other words, *shabattum* for the Babylonians meant a day in which it was necessary to observe certain precautions in order to insure the 'pacification' of the gods. What these precautions were are learned from a religious calendar in which it is told that the King is not to ride in his chariot, nor to don finery, nor to eat cooked meat, nor to bring sacrifices until the evening of the 7th, 14th, 19th, 21st, and 28th day of the month, which are designated as unfavorable or inauspicious days. These regulations are prescribed only for the King, upon whose conduct toward the gods the general disposition of the gods, and hence the welfare of the country, depended. There are traces in the Pentateuchal codes that the 'Sabbath' was once regarded as an inauspicious day on which it was not advisable to risk the displeasure of Yahweh, or even safe to seek His presence. There is also some evidence that a 'Sabbath' observed not every seventh day, but on the 7th, 14th, 21st, and 28th day *after* the new moon, was an ancient institution which the Hebrews shared with the Babylonians, but these considerations only point to an ultimate common origin for the Hebrew and Babylonian Sabbath.

BIBLIOGRAPHY. Consult the Hebrew archæologies of Nowack and Benzinger; Wellhausen, *Prolegomena zur Geschichte Israels* (4th ed., Berlin, 1895; Eng. trans., Edinburgh, 1885); Montefiore, *Religion of the Ancient Hebrews* (Hibbert Lectures, London, 1893); Smend, *Alttestamentliche Religionsgeschichte* (Freiburg, 1893); Jastrow, "Original Character of the Hebrew Sabbath," in the *American Journal of Theology* (New York, 1898); Hessey, *Sunday, Its Origin, History, and Present Obligation* (Bampton Lectures for 1860; new ed., London, 1889); Abrahams, *Jewish Life in the Middle Ages* (ib., 1896).

SABBATHAI ZEVI. A pseudo-Messiah of the Jews. See JEWISH SECTS; MESSIAH.

SABBATICAL YEAR. An institution of the Pentateuchal codes, according to which, primarily, the fields were to lie fallow every seven years; afterwards the provisions were extended to include relief from various obligations incurred by members of the community. The Sabbatical year is referred to in all of the three chief codes (the Book of the Covenant, the Deuteronomic Code, and the Priestly Code; see HEXATEUCH). In the first and third, special stress is laid upon the provision requiring the land to lie fallow (Ex. xxiii. 10-11; Lev. xxv. 3-7); in the Deuteronomic Code no reference to such an ordinance occurs. Again, the first two codes agree in providing for the remission of slaves after six years' service (Ex. xxi. 2-6; Deut. xv. 12-18); the Priestly Code provides for such emancipation only in the fiftieth or jubilee year (Lev. xxv. 39-55). Lastly, the Priestly Code (Lev. xxv. 8-10; 12-16; 23-34) is unique in providing under certain conditions for the 'release' in the jubilee year (i.e. the seventh Sabbatical year) of patrimonial estates which have been sold, to the end that such estates should not be permanently alienated. Deuteronomy (xv. 1-3) has a special ordinance for the remission or suspension of debt every seven years.

These divergences indicate a gradual evolution of the institution, beginning with the custom, common in agricultural communities, of letting the land lie fallow at periodical intervals. The Book of the Covenant does not specify that the same year shall be observed by all districts and all individuals. So impracticable an injunction is found only in the 'theoretical' Priestly Code. On the other hand, the remission of Hebrew slaves after six years of service had apparently become a dead letter, and accordingly the term of service is extended, and a general emancipation appointed every fifty years, no matter how long (or short) a period of service had preceded. The remission of debt also disappears in the Priestly Code, but instead, stipulations are inserted for the reversion of property to the original owners in the jubilee year. Hence it is

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very probable that the only feature of the Sabbatical year which was carried out in practice was the ordinance requiring that the land should lie fallow every seven years. Consult the archæologies of Benzinger and Nowack. See JUBILEE.

SABEL/LIUS. A celebrated heretic of the third century who taught that God manifests Himself in three successive modes, or forms, without, however, recognizing any real personal distinctions in the Godhead, as did the orthodox. (See TRINITY; NICENE CREED.) Our information respecting the events of Sabellius's life is very scanty, only a few fragments of his works having survived and the existing accounts being written by his theological opponents. He was perhaps born in the Libyan Pentapolis, where his peculiar views were afterwards widely current. Early in the third century he took up his residence in Rome, where he adopted Monarchian views, especially those of a modalistic type. (See MONARCHIANS.) Here he was excommunicated by Pope Callistus (or Calixtus). Leaving Rome, Sabellius went to Ptolemais, where he was made presbyter and met with much success in propagating his views. The Sabellian view of the Trinity is this: The One Divine Essence, or Substance, unfolds itself in creation and in human history as a trinity. God operating in the works of nature is Father; God operating in Jesus Christ, to redeem men from sin, is Son; and God operating in the hearts of believers is Holy Spirit. But these three are not eternal divine hypostases, or persons (see HYPOSTASIS); they are merely so many successive manifestations of the one God. Besides the works of Hippolytus, Athanasius, and Epiphanius, consult: Fisher, *History of Christian Doctrine* (New York, 1896); Harnack, *History of Dogma*, vol. iii. (Eng. trans., London, 1897); Rainy, *The Ancient Catholic Church* (ib., 1902); Cheetham, *Church History of the First Six Centuries* (ib., 1894).

SABIANS. See SABÆANS.

SABIANS. A name given by Mohammed and early Moslem writers to a people classed with those possessing a written revelation, distinguished from idolaters and accorded an exceptional position, probably the Mandæans (q.v.). From the ninth to the twelfth century it was falsely applied to themselves by the pagans of Harran for the purpose of escaping persecution; and in later times it was used indiscriminately of both Mandæans and pagans of Harran, or explained as apostates from the true faith, or worshipers of the host of heaven. There are three passages in the Koran in which Mohammed refers to the Sabians. A number of passages from Buchari, Ibn Hisham, and Aghani have been collected, which show that Mohammed himself and his followers were designated as 'Sabians' by their pagan contemporaries. The reason for this designation must have been some practice or belief that to the popular mind identified Mohammed and his followers with the Sabians. As the name Sabians undoubtedly is derived from *ṣaba'-ṣaba'*, 'to immerse,' there can be no question but that a sect practicing baptism is meant. The relations of the Elkesaites (q.v.), Hemerobaptists, Mughtasila, and Mandæans have not yet been cleared up. But the emphasis put upon their sacred books renders it perhaps probable that some branch of the Mandæans is intended. (See MANDÆANS.) It was the institution of ablutions before the daily prayers that seemed so peculiar to the pagan Arabs and led them to describe the Moslem as Sabians.

According to the testimony of a Christian writer, Abu Yusuf Absha'a al-Qathi'i, who lived at the end of the ninth century, some of the pagans in Harran who were neither willing to become Christians nor to adopt Islam gained for themselves toleration by following the advice of a Moslem lawyer to call themselves Sabians. This was in the year 830. A Sabian cult-community was formed in Bagdad, and among its members were men of great learning and influence. The greatest of all these so-called Sabians were Thabit ben Qorrah (died 901), who wrote 150 works in Arabic and 16 in Syriac, and Abu Ishak Ibrahim, poet, scientist, and historian. But many eminent men were among their descendants to whose enthusiastic study of Greek antiquity and liberal views on theology their Mohammedan contemporaries were greatly indebted. Through Shakrastani, Maimonides, and others their religious and philosophical views became known to European scholars. At first these accounts caused much confusion. Hottinger identified the Sabians with the Sabæans (q.v.); Golius regarded them as star-worshipers. Although based on wholly impossible etymologies, these explanations were widely accepted. Spencer understood the term to designate Oriental idolaters in general. Norberg first proposed the correct etymology and Michaelis distinguished between two kinds of 'Sabians,' the Mandæans and the star-worshipers. Saint Martin was the first to call attention in 1825 to the fact that the Harranians were known as Sabians by Arabic writers. It is the merit of Chwolson to have presented all the important literary material bearing on the question and to have drawn the conclusions now generally accepted as to the use of the term in Arabic literature, thereby putting an end to the baseless speculations about 'Sabism.' Consult: Chwolson, *Die Ssabier und der Ssabismus* (Saint Petersburg, 1856); Wellhausen, *Reste arabischen Heidentums* (2d ed., Berlin, 1897).

SA'BIN, JOSEPH (1821-81). An American bibliographer, born at Braunston, Northamptonshire, England. After serving as an apprentice to Charles Richards, an Oxford bookseller, he set up an independent shop, and published in 1844 *The XXXIX Articles of the Church of England, with Scriptural Proofs and References.* In 1848 he removed to the United States, where he conducted shops for the sale of old and rare books and prints, from 1850 to 1856 at New York, from 1856 to 1860 at Philadelphia, and again at New York from 1860. He prepared auction catalogues of many important libraries, including that of Edwin Forrest (1863); undertook in 1868 the publication of *A Dictionary of Books Relating to America, from Its Discovery to the Present Time,* continued by others as *Bibliotheca Americana* (20 vols., 1868-92); and prepared *A Bibliography of Bibliography; or, A Handy Book About Books Which Relate to Books* (1877). He also published two series of reprints concerning American history, one of tracts in seven volumes (1865), and one of more extended works in five volumes (also 1865). *A List of the Printed*

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Editions of the Works of Fray Bartolomé de las Casas, Bishop of Chiapa (1870), was extracted from the *Dictionary*. Sabin was the editor of *The American Bibliopolist* (New York, 1869-75).

SA'BINE. A river which rises in the northeastern part of Texas, and flows southeast to the Louisiana boundary, then southward, forming the boundary between Texas and Louisiana, until it empties through Sabine Lake and Sabine Pass into the Gulf of Mexico (Map: Texas, H 4). It is about 500 miles long, but navigable only for a short distance, and for small vessels. The navigation of the pass has been improved by dredging and jetty-building. The Sabine is an historic stream and was involved in the sharp boundary controversy between Spain and the United States.

SABINE. A shrub. See SAVINE.

SABINE, säb'ĭn, Sir EDWARD (1788-1883). A British physicist and soldier. He was born in Dublin, and after receiving a military education at Marlow and Woolwich, served in the Royal Artillery. He saw active service in the war with the United States in 1812, being captured by the United States privateer *Yorktown* and participating in the actions on the Niagara frontier in 1814. He accompanied Sir John Ross (q.v.) and Sir William Parry (q.v.) in their expedition (1818-20) to the north coast of America (see ARCTIC REGIONS and POLAR RESEARCH), making a series of observations of great value. He later (1821-23) undertook a series of voyages, visiting many places between the equator and the north pole, and making at each point observations on the length of the seconds pendulum, and on the dip and intensity of the magnetic needle, the results of these observations being published, along with other information, in 1825. His many experiments dealt with almost every phase of terrestrial magnetism and he extended magnetic science by causing the establishment of magnetic observatories in different parts of the world, and by the collation of the enormous mass of facts thus acquired. In 1818 Sabine was elected a fellow of the Royal Society; in 1856 he was raised to the rank of major-general; and in 1869 he was created a Knight Commander of the Bath. He was the author of a work *On the Cosmical Features of Terrestrial Magnetism* (1862), and contributed many papers to the *Philosophical Transactions* of the Royal Society, the *Philosophical Magazine*, and other scientific journals.

SABINE, sä'bĭn, LORENZO (1803-77). An American author and politician, born in New Lisbon, N. H. After a meagre education, he became a merchant and bank officer, and for some time was secretary of the Boston Board of Trade. He also served three terms in the Maine Legislature. In 1852 he became secret agent of the United States Treasury Department, and served nine weeks in Congress. His best known publications are a *Life of Commodore Preble* (1847), in "Sparks's American Biography;" *The American Loyalists* (1847); *Notes on Duels and Dueling* (1855); and an address on the *Hundredth Anniversary of the Death of Major-General Wolfe* (1859).

SABINES (Lat. *Sabīnī*). An ancient people of Central Italy, of Umbro-Sabellian stock, whose territory lay to the northeast of Rome. Their land appears to have extended from the sources of the Nar, on the borders of Picenum, as far south as the Anio. The nations conterminous to the Sabines were the Umbrians on the north, the Umbrians and Etruscans on the west, the Latins and Æqui on the south, and the Marsi and Picentini on the east. The entire length of the Sabine territory did not exceed 85 miles, reckoning from the lofty and rugged group of the Apennines, anciently known as the *Mons Fiscellus* (now *Monte della Sibilla*), to Fidenæ on the Tiber, which is not more than five miles from Rome. None of their towns were of any size or political importance. The inhabitants had no inducements to congregate in large towns. Their country was an inland region; much of it, especially in the north, very mountainous and bleak, though the valleys were (and are) often richly productive. The Sabines were a brave, stern, religious race, whose virtues were all of an austere and homely character. Their part in the formation of Rome is mentioned under ROMULUS. The whole territory of Sabinum fell under Roman sway after the victory of M. Curius Dentatus in B.C. 290, and in B.C. 268 its inhabitants received the full Roman franchise, while about B.C. 240 they were enrolled in the newly formed *tribus Quirina*. No literature or inscriptions remain in the Sabine dialect, which has to be studied from the few words quoted by the ancients as Sabine (all with Latin terminations) and from place and personal names. It was early driven out by the dialect of the Latin conquerors.

SABINIANS. A school or sect of Roman jurists during the first and second centuries of the Christian Era. Its origin was ascribed to Capito, head of one of the law schools at Rome in the time of Augustus, as the origin of the rival Proculian sect was ascribed to Labeo, a distinguished contemporary teacher and writer. Each school, however, took its name from a pupil and successor of its founder: the Sabinian school from Masurius Sabinus, second head of the school and author of a standard commentary on the civil law. His successor was Cassius Longinus, who flourished in the reign of Nero and enjoyed so high a reputation that the later adherents of the sect sometimes termed themselves Cassians. Other distinguished members of the school were Salvius Julianus, Pomponius, Africanus, and Gaius. Gaius was the last jurist who regarded himself as an adherent of either of the two schools, and in not a few cases he accepts, in his Institutes, the doctrines of the Proculians. See CIVIL LAW; PROCULIANS; and for literature, consult Muirhead, *Historical Introduction to the Private Law of Rome* (2d ed., Edinburgh, 1899).

SABLE (OF., Fr. *sable*, black, from Russ. *soboli*, Lith. *sabalas*, sable, perhaps from Turk. *samūr*, from Ar. *sammūr*, martin). A fur-bearing animal, noted for yielding the most valuable pelt of any of the Mustelidæ, of which two species exist, one in Northern Russia and Siberia (*Mustela zibellina*), and one in Canada (*Mustela Americana*); but the latter is usually known as the pine-marten. The Siberian sable, exclusive of the tail, is about 18 inches long. The fur is dark brown (not black), grayish-yellow on the throat, and small grayish-yellow spots are scattered on the sides of the neck. The whole fur is extremely lustrous, and hence of the very

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highest value, an ordinary sable skin being worth $30 or $35, and one of the finest quality $200. The fur attains its highest perfection in early winter, and the pursuit of the sable at that season is one of the most difficult and adventurous of enterprises. It is taken by traps, which are of a kind to avoid injury to the fur, and it is not easily captured. Its general habits are those of the marten (q.v.). See Plate of FUR-BEARING ANIMALS.

SABLE. The name for black in heraldry (q.v.).

SABLE, CAPE. See CAPE SABLE.

SABLE ANTELOPE. A large antelope of South Africa (*Hippotragus niger*), remarkable for its glossy black coat, sharply set off by the white of the under parts, buttocks, and parts of the face. It carries its head high, its neck is adorned with a heavy mane, and it has long, curving, and heavily ringed horns, which it uses with terrible effect when attacked by packs of the Cape hunting-dogs or by hunters' hounds. It has been known to impale and kill leopards and even lions. It formerly ranged over all the high plains in small herds which had great speed and endurance, and its beauty and the sport it afforded have been enthusiastically commented upon by every South African hunter, but it is now scarce. Consult *The Book of the Antelopes* (London, 1894-1900). See Plate of ANTELOPES.

SABLE ISLAND. A low-lying crescent-shaped island in the Atlantic Ocean, situated in latitude 44° north and longitude 60° west, 104 miles southeast of Cape Canso (Map: Nova Scotia, D 6). Formed of sandhills thrown up by the sea, it is about 25 miles long by 1¼ miles wide. The sandhills surround a shallow lagoon 11 miles long, and nowhere exceed 80 feet in height. The island lies in the track of navigation between America and Great Britain; since 1873 it has had three lighthouses built upon it by the Canadian Government, two of which have been swept away by the sea, which frequently levels the outlying hills. From 1583 to 1899, 170 vessels were lost on its treacherous shoals. A life-saving establishment of 30 persons is now stationed here. In 1901 the Canadian Government completed arrangements for checking the shifting of the sands and making the island a more prominent feature on the ocean by the planting of 68,000 spruces, pines, and junipers, and 13,000 hardy, deciduous trees. Covered with wild grasses and cranberry bushes, which formerly supported a breed of wild horses, known as Sable Island ponies, the island is interesting to the naturalist as the only known nesting place of the Ipswich sparrow.

SABLES D'OLONNE, sä'bl' dô'lŏn', LES. The capital of an arrondissement and a seaport in the Department of Vendée, France, 23 miles south of La Roche-sur-Yon by rail (Map: France, E 5). Oyster and sardine fishing and canning and shipbuilding are carried on. There is a lighthouse, visible for 14 miles. The fine, sandy beach, encircled by a wide promenade, carriage road, and elegant villas, attracts numerous summer visitors. Population, in 1901, 12,244.

SABOTS, sä'bō' (Fr., wooden shoe). A species of wooden shoes much used by the French and Belgian peasantry, especially by those who inhabit moist and marshy districts, as an effectual protection of the feet from external moisture. The fabrication of sabots forms an important branch of French industry, and is chiefly carried on in the departments of Aisne, Aube, Maine-et-Loire, and Vosges. After being made they are subjected to the smoke of burning wood till they acquire the reddish color so much prized in certain countries. See SHOES AND SHOE MANUFACTURE.

SABRE. See SWORD.

SABRE-TOOTHED TIGER. The Machærodontidæ, or sabre-toothed cats, comprise a group of fossil cat-like mammals, characterized chiefly by enlargement of the upper canine teeth. By some writers they are regarded as constituting a distinct family, while others rank the group as a subfamily of the Felidæ. The term 'sabre-toothed tiger' designates particularly *Smilodon* (or *Machærodus*) *neogæus*, a fossil cat from the Pleistocene deposits of South America, of which complete skeletons have been found exceeding the lion in size. It is chiefly remarkable by reason of the enormous development of the upper canines, which are seven inches long and flattened, with finely serrated cutting edges. In compensation for the enlargement of these teeth, the lower canines are so reduced as to resemble the incisors. The brain is proportionally smaller than in the modern large cats. In England the sabre-toothed tigers are known to have been contemporaneous with cave man. The group attained its highest specialization and finally became extinct in the Pleistocene period. A nearly allied form (Nimravus) occurs in the Middle Miocene of Oregon.

SABRI'NA. Daughter of Locrine, the son of King Brute of ancient Britain, and Estrildis, thrown into the river Severn by Queen Guendolen, and metamorphosed by Nereus into the goddess of the river. She is described as a nymph in Drayton's *Polyolbion*, in Milton's *Comus*, and in Fletcher's *Faithful Shepherdess*.

SAC AND FOX INDIANS. A confederacy of the two North American Indian tribes of Sacs or Sauks and Foxes or Muskwaki. The tribes combined about 1760 as a result of the attacks of the Ojibwa (q.v.) and of the French. The united population in 1903 was about 930. See FOX or MUSKWAKI; SAUK.

SACCARDO, säk-kär'dô, PIETRO ANDREA (1845—). An Italian botanist, born at Treviso, and educated at the Liceo of Venice and in the University of Padua, where he became professor of botany in 1879 after ten years as teacher of natural history in the school of technology of the same city. Save for his *Sommario d'un corso di botanica* (3d ed. 1880), his work is almost entirely on mycology. Following such special treatises as *Musci Tarvisini* (1872) and *Fungi Italici* (1877-86, with 1500 colored plates), came his great universal work, *Sylloge Fungorum*, in ten volumes, which began to appear in 1882.

SACCHARIN, säk'kä-rĭn (from ML. *saccharum*, Lat. *saccharon*, from Gk. σάκχαρον, *sakcharon*, sugar, from Pers. *sakar*, from Prakrit *sakkara*, sugar, Skt. *sárkarā*, candied sugar, grit), ortho-benzo-sulphimide, $C_6H_4\begin{matrix}CO\\SO_2\end{matrix}NH$. An intensely sweet substance discovered by Remsen and Fahlberg in 1879. Its sweet properties were not recognized until some time after. The substance was patented in the United States and in Euro-

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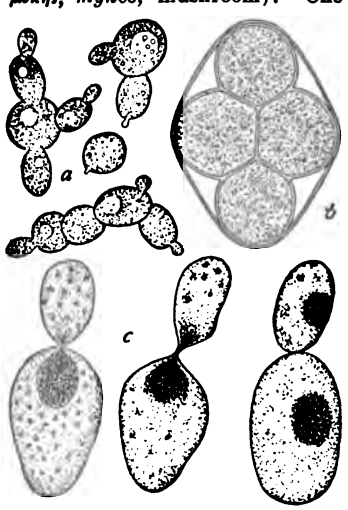
pean countries, and is now manufactured on a large scale in Germany. The process is as follows: Toluol, $C_6H_5CH_3$, a hydrocarbon obtain from coal-tar, is carefully treated with concentrated sulphuric acid; the result is a mixture of ortho- and para-toluol-sulphonic acids. These are acted on by phosphorus pentachloride, which converts them into the corresponding ortho- and para-toluol sulphochlorides. The ortho-compound is liquid, and is easily separated by pressure from the solid para-derivative, which is discarded. The ortho-toluol sulphochloride, whose formula is $C_6H_4\begin{cases}CH_3\\SO_2Cl\end{cases}$ is now treated with ammonia, which produces the ortho-toluol sulphamide, $C_6H_4\begin{cases}CH_3\\SO_2NH_2\end{cases}$. This is then oxidized by potassium permanganate, and thus converted into ortho-benzo-sulphimide, $C_6H_4\begin{cases}CO\\SO_2\end{cases}NH$, the final product, which is precipitated from the solution on adding an acid. It forms a white powder, only slightly soluble in water, but readily soluble in alkaline liquids. Recent experiments show that the pure substance possesses about 500 times the sweetening power of cane-sugar. The commercial product, however, often contains as much as 50 per cent. of impurities, and its sweetening power is only about 300 times as great as that of cane-sugar. Saccharin is usually sold in tablets of one grain each, mixed with a little bicarbonate of soda, to increase solubility. These may be dissolved in water, in milk, or in coffee. Saccharin is now largely used in the manufacture of cordials and mineral waters, in baking, preserving fruit, etc.

SACCHAROMYCETES, săk'kâ-rô-mī-sē'tēz (Neo-Lat. nom. pl., from ML. *saccharum*, sugar + Gk. *μύκης*, *mykēs*, mushroom). One of six



YEAST.

a, reproduction by budding; *b*, formation of spores; *c*, nuclear division in budding.

great groups of fungi (q.v.), and containing the yeasts. (See FERMENTATION.) Yeasts are one-celled plants with a peculiar method of growth termed budding, in which the cell puts out one or more processes which finally become pinched off from the mother cell. The buds may remain attached for a long time, so that they form an irregular group of cells clinging together. Many yeasts form spores, the protoplasm separating into two or four masses that become walled and lie inside the mother cell. Saccharomyces cerevisiæ, the beer yeast, has been cultivated for centuries and is not known in the wild state. The origin of such yeasts is not certain, but all evidence points to their derivation from some of the higher fungi. The conidia of many ascomycetes and basidiomycetes, and especially the smuts, will bud extensively in culture solutions and induce fermentation. None of the cultivated yeasts are known to have come from these wild yeast stages, which are generally mere passing phases of much more complicated life histories. The yeast of wine fermentation is said to originate from spores of the filamentous mildew-like fungus (Dematium) that grows on the surface of grapes. It is well understood that the cultivated yeasts constitute fixed species that have not been made to develop into other fungi. The identification of yeasts is a matter of practical importance to those who use the organisms in brewing, because certain wild yeasts seriously injure or spoil the work of the beer yeast. The species are distinguished chiefly by physiological characters, among which are the maximum and minimum temperatures of growth, and the optimum temperature for spore formation. Some beers and ales owe their peculiarities not alone to the character of the wort, but to the specific nature of the yeasts employed.

SACCHETTI, sâk-kĕt'tê, FRANCO (c.1330-c.1399). An Italian novelist and poet, born in Florence. His most important work is a collection of several hundred *Novelle*, simple, straightforward descriptions of real events in many instances, and admirable pictures of the society of his time. They were written about 1392-95, and were first published in 1724. The best edition is that of Gigli (Florence, 1860). Ten of the tales are translated in Roscoe's *Italian Novelists* (1825). His ballads are of great freshness and charm. There is a good edition of them by Franchi and Majonchi (Lucca, 1853), and some of the best are included in Carducci's *Studi letterarii*.

SACCHINI, sâk-kē'nê, ANTONIO MARIA GASPARO (1734-86). An Italian operatic composer of the Neapolitan school. He was the son of a fisherman, born in the environs of Naples, and owed his musical education to Durante. His first marked success was the opera *Semiramide*, produced at Rome in 1762. In consequence of the success in Venice of *Alessandro nell' Indie* (1768), he became director of the Conservatory del Ospedaletto in that city. In 1771 he went to London, where he spent the next ten years, scoring several successes. He then went to Paris, where he wrote two new works, *Dardanus* (1784), and his most famous production, *Œdipe à Colone* (1786). He also wrote a large number of sacred compositions and some chamber music.

SACHALINE, or GIANT KNOTWEED (*Polygonum sachalinense*). A hardy perennial herb 6 to 12 feet high with strong, extensively spreading rootstocks, broad, nearly heart-shaped leaves oft-

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en a foot in length, and small greenish flowers, which appear late in autumn. The plant is a native of Eastern Siberia, from whence it was brought to Europe and grown in many botanic gardens. It came prominently into notice about 1893, when the drought in Western Europe caused a decided shortage in forage for cattle. This plant was little affected, and since its tender shoots and leaves were eaten by stock, the plant was widely grown experimentally as a forage crop. It has proved less useful than was predicted, and its cultivation in the United States has been almost entirely abandoned. False sachaline (*Polygonum cuspidatum*) has smaller and more pointed leaves.

SACHAU, zä'gou, EDUARD (1845—). A German Orientalist, born in Neumünster, and educated at Kiel and Leipzig. In 1869 he became professor of Semitic languages in Vienna, and in 1876 went to the University of Berlin, where, in 1887, he took charge of the new Oriental Seminar. Sachau traveled much in the East, and published, among many other volumes, an English translation of Alberuni's *Chronology of Ancient Nations* (1879; Arabic text, 1876-78) and of the same writer's *India* (1888; Arabic text, 1887); *Reise in Syrien und Mesopotamien* (1883); *Arabische Volkslieder aus Mesopotamien* (1889); *Ueber die Poesie in der Volkssprache der Nestorianer* (1896); *Mohammedanisches Recht* (1897); *Am Euphrat und Tigris* (1900); and several valuable catalogues of Persian, Syriac, and Arabic manuscripts.

SACHER-MASOCH, sä'gĕr mä'zŏg, LEOPOLD VON (1835-95). An Austrian novelist. He studied at Gratz and Prague, taught history at Gratz, and published (1857) *Der Aufstand in Gent unter Karl V.* His first novel, *Eine galizische Geschichte*, appeared in 1866. His fiction, devoted in part to Galician life, is unsavory, sensational, but of rich imagination. Best known of his many novels is *Das Vermächtnis Kains* (1870).

SACHEVERELL, sâ-shĕv'ĕr-ĕl, HENRY (c.1674-1724). An English high churchman. He was born at Marlborough and was educated at Magdalen College, Oxford. In 1705 he became preacher of Saint Saviour's, Southwark. His prominence is due to two sermons preached in 1709, one at Derby, the other at Saint Paul's, in which he attacked the principles of the Act of Settlement, asserted the doctrine of non-resistance, and decried the Act of Toleration. The House of Commons impeached him for these utterances, and the Lords found him guilty. But popular opinion rose so strong in the preacher's favor that the authorities dared go no further than to suspend him from preaching for three years and to order the obnoxious sermons to be publicly burned. Sacheverell became, for the time, the most popular man in the kingdom. At the general election, which came on almost immediately, his prosecution was the decisive issue, and brought about the defeat of the Whigs, who had been the political party in power. When, in 1713, his suspension expired, he was appointed by the new Tory House of Commons to preach before them the sermon on the anniversary of the Restoration, and was specially thanked on the occasion. Consult: Howell, *State Trials*, vol. xvi. (London, 1809-26); Stanhope, *History of Queen Anne's Reign* (ib., 1872).

SACHEVERELL, WILLIAM (1638-91). An English politician. He first appeared in Parliament in 1670, and at once joined the opposition, where he came into prominence almost immediately. In 1673 he began the movement which brought about the downfall of the Cabal (q.v.) and the passage of the Test Act (q.v.). His hostility to the Court policy, however, continued unabated. Especially did he advocate a return to the Triple Alliance of 1668 between England, Spain, and Holland. Sacheverell was the first man who openly suggested the exclusion of the Duke of York from the succession. He made the proposal in 1678 and continued to advocate it even against the wishes of the party leaders. A year later he succeeded in getting a bill to this effect before the House, but Parliament was prorogued and dissolved before it could be read a third time. In the new Parliament he was one of the managers of Lord Stafford's trial. On the accession of James II. he was forced into retirement, but with the Revolution he again came into prominence, serving on the committee which drew up the Declaration of Right. He also was among the most active of those who tried to disfranchise the Tories implicated in the obnoxious measures of James.

SACHS, säks, BERNARD (1858—). An American neurologist, born in Baltimore, Md., and educated at Harvard and in the University of Strassburg. After research in Vienna and Berlin, he began to practice medicine in New York City in 1883 as a specialist in nervous diseases. Dr. Sachs first described the disease known as amaurotic family idiocy. He contributed to Keating's *Diseases of Children* (1890), to Hare's *Therapeutics* (1892), and to Hamilton's *Medical Jurisprudence* (1894), as well as to German, British, and American neurological journals; and wrote *Nervous Diseases of Children* (1895; German version, 1897).

SACHS, säks, HANS (1494-1576). A German poet and dramatist, the best and also the most prolific of the *Meistersingers* (q.v.). He was born in Nuremberg, the son of a shoemaker, to whose trade he was trained, having first enjoyed a classical education at the town Latin school. After his apprenticeship he entered on the usual years of journeyman wandering in 1511 and passed five years practicing shoemaking in many places of South and North Germany, among them Passau, Munich, Salzburg, Regensburg, Leipzig, Osnabrück, and Lübeck. Returning to Nuremberg in 1516, he married in 1519 and again in 1561; he was diligent alike at his trade and his literary avocation, gained high esteem among his townsmen both as burgher and poet, took earnest but eirenic interest in the Reformation movement, and died in 1576. Though early trained in the rules of the *Meistergesang*, he soon emancipated himself from their excessive pedantry. His versification was always mechanical and his purpose prevailingly didactic, but his humor was exuberant, his imagination fertile, and his fancy tireless. He wrote hymns, some of which did great service to the Reformation in its first decades, fables, allegories, merry tales (*Schwänke*), dialogues, comedies, and Shrove-tide plays (*Fastnachtspiele*); in all some 6300 pieces. In an often-quoted and characteristic passage in a preface of 1560, he describes his poetry as "an open public pleasure garden by the wayside for the

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common man, in which you may find not only some trees bearing sweet fruit for the food of the healthy, but roots and herbs sharp and bitter, for medicine to purge sick minds and expel the peccant humors of vice. There you may find, too, fragrant violets, roses, and lilies from which to distill and prepare precious waters, oils, and essences that may strengthen and restore feeble, troubled, and weak minds; and finally, weeds and field flowers, clovers, thistles, and cornflowers, to make the gloomy and melancholy gay and light-hearted by their bright and beautiful colors." Sachs's work continued popular till the days of Opitz; then his fame suffered almost total eclipse till it was revived by Goethe, especially through his *Hans Sachsens Poetische Sendung* (1776). The best edition is in 23 vols. by A. von Keller and C. Goetze in the *Bibliothek des Stuttgarter Litterarischen Vereins* (Stuttgart, 1886-96). The best selection is by Gödeke and Tittmann in *Deutsche Dichter des 16ten Jahrhunderts* (2d ed., Leipzig, 1883-85). Consult also Schweitzer, *Etude sur la vie et les œuvres de Hans Sachs* (Nancy, 1889); Drescher, *Studien zu Hans Sachs* (Berlin, 1890; Marburg, 1891); Genée, *Hans Sachs und seine Zeit* (2d ed., Leipzig, 1902); Goetze, *Hans Sachs* (Nuremberg, 1894); Suphan, *Hans Sachs in Weimar* (Weimar, 1894), and *Hans Sachs: Humanitätzeit und Gegenwart* (Weimar, 1895); *Hans Sachs-Forschungen* (ed. by Stiefel, Nuremberg, 1894).

SACHS, JULIUS VON (1832-97). A German botanist, founder of the modern science of experimental vegetable physiology. He was born in Breslau. After a year in Freiburg he became professor at the University of Würzburg in 1868, and built up there a great physiological laboratory. Of especial importance were his researches on the influence of light, natural and colored, on plant assimilation, and on heliotropic curves. In the matter of assimilation of starch and its test by iodine applications, and of culture in nutrient solutions, his work was that of a pioneer, and the same may be said of his law of the 'three cardinal points' in the relation of germination to temperature and of his work on tropism. He wrote: *Handbuch der Experimentalphysiologie der Pflanzen* (1865); a *Lehrbuch der Botanik* (1866); *Vorlesungen über Pflanzenphysiologie* (1882); *Geschichte der Botanik* (1875; English translation, 1890); and *Gesammelte Abhandlungen über Pflanzenphysiologie* (1892-93).

SACHSENSPIEGEL, zäk'sen-shpē'gel (Ger., Mirror of Saxony). The best German law treatise of the Middle Ages. It was a private compilation of the customary law of Saxony, made by Eike von Repgow, c.1230. Although not authoritative, it had much influence and was the source of other treatises on law. The best edition is by Homeyer (3 vols., Berlin, 1835-44). Consult Stobbe, *Geschichte der deutschen Rechtsquellen*, vol. i. (Brunswick, 1864).

SACK (Fr. *sec*, from Lat. *siccus*, dry). A name given in England in the seventeenth century to the strong white wines from the south of Europe. Originally the term applied to dry light-colored wines, and to the punch made by sweetening and flavoring them.

SACK'ETTS HARBOR. A village in Jefferson County, N. Y., 11 miles west of Watertown; on Black River Bay, Lake Ontario, and on the Rome, Watertown and Ogdensburg branch of the New York Central and Hudson River Railroad (Map: New York, D 2). Madison Barracks (q.v.), a United States military post; Fort Tompkins Park, the scene of a battle in the War of 1812; and a United States naval station, are noteworthy features. Sacketts Harbor is admirably situated, but its commercial and industrial interests are insignificant. Population, in 1890, 787; in 1900, 1266.

Founded by Augustus Sackett in 1801, Sacketts Harbor had a score of houses by 1812, and was the centre of a considerable trade with Canada. During the War of 1812 the frigates *Superior* and *Madison* were built here in 80 days and 45 days respectively. On May 29, 1813, the place was unsuccessfully attacked by a British force under Prevost. The English lost 259 in killed, wounded, or missing, while the Americans lost only 23 killed and 114 wounded. Consult an article by Willcox, "Sacketts Harbor and the War of 1812," in *Jefferson County Historical Society Transactions* (Watertown, 1886-87).

SACK'VILLE, CHARLES, sixth Earl of Dorset (1638-1706). An English poet and patron of letters at the Court of Charles II. Immediately after the Restoration, he was elected to Parliament. For some years he lived a very dissipated life, engaging in several disgraceful 'frolics.' In 1665 he served as a volunteer against the Dutch, and after this lived a life of leisure, gaining a deserved reputation for his wit and his patronage of letters. Dryden dedicated to him the *Essay of Dramatic Poesy* and introduced him under the name of Eugenius into the dialogue of this famous piece of criticism. He was also a friend of Waller, Butler, and Wycherley, and was beloved by Prior in the next generation. He lost some of his prestige under James II., but regained it under William. On the death of his father (1677) he succeeded to the earldom; in 1691 he was honored with the Garter; and he served three times as Regent during King William's absences. Sackville's reputation as poet now rests mainly upon the poem beginning, "To All You Ladies Now at Land." It is said to have been written at sea on the night before the great naval battle with the Dutch (June 3, 1665). Consult Johnson's *Lives of the Poets;* Ward's *English Poets* (vol. ii.); and the *Musa Proterva*, ed. A. H. Bullen (London, 1889).

SACKVILLE, GEORGE GERMAIN, first Viscount (1716-85). An English soldier and statesman. He was the third son of the first Duke of Dorset and was educated at Westminster School and at Trinity College, Dublin. He served with the Duke of Cumberland, was wounded at Fontenoy, and was promoted to be lieutenant-general. As commander of the British forces in Germany, he served under Ferdinand of Brunswick, but for his failure to carry out the order of the commander-in-chief to charge the retiring French cavalry and infantry at the battle of Minden in 1759, was dismissed from the service, a sentence that was confirmed by the court-martial that he demanded. He was reinstated in royal favor by George III., and, as Lord Germain, became Secretary of State for the Colonies in the Cabinet of Lord North during the American Revolutionary War, incurring a share of the odium attached to that statesman's policy. He was raised to the peerage as Viscount Sackville in 1782.

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SACKVILLE, Lionel Sackville-West, Baron (1827—). An English diplomat. The son of the fifth Earl de la Warr, he was born at Bourn Hall, Cambridgeshire. He received a private education; entered the diplomatic service in 1847, and prior to 1868 was attached successively to the British legations at Lisbon, Naples, Stuttgart, Berlin, Turin, and Paris. He became British Minister to the Argentine Republic in 1873, to Spain in 1878, and to the United States in 1881. He was a member of the North American Fisheries Commission in 1888. The same year, in the American Presidential campaign, a decoy letter now known as the 'Murchison letter,' presumably sent by a naturalized citizen of British birth, requested his views on the attitude of the Administration toward England. His answer, which claimed that the reëlection of Cleveland would be advantageous to British interests, was published, and gave offense to the President, who sent him his passports, thus terminating his career at Washington, and, incidentally, his political life.

SACKVILLE, Thomas (1536-1608). The first Earl of Dorset and Baron Buckhurst, an English poet and statesman. He was born at Buckhurst, Sussex, in 1536. He joined the Inner Temple and was called to the bar. In conjunction with Thomas Norton (q.v.) he wrote the first English tragedy in blank verse, *Ferrex and Porrex*, afterwards called *Gorboduc* (q.v.), performed at the Inner Temple on Twelfth Night, 1560-61. It is founded on British legend and is molded to the form of Latin tragedy. It has no dramatic life or energy, but the style is pure and stately, evincing eloquence and power of thought. Sackville's other productions (first published in 1563) are the *Induction*, a poetical preface to the *Mirror for Magistrates*, and the *Complaint of the Duke of Buckingham*, which was designed to conclude the work. The *Induction* is a noble poem, uniting, as Hallam says, "the school of Chaucer and Lydgate to the *Fairy Queen*." Soon after his father's death in 1566, he was created Lord Buckhurst, and became a favorite with the Queen, who employed him in foreign diplomacy. He went to Parliament as early as 1557. In the spring of 1568 he was sent to France, where he twice negotiated for the Queen's marriage. In 1587 he incurred her displeasure by what she called his shallow judgment in diplomacy and he was confined to his own house as a prisoner for six months. On the death of Leicester he returned to favor. He succeeded Burleigh as Lord High Treasurer (1599). On the accession of James his patent of office was renewed for life, and in the following year he was created Earl of Dorset. He was buried in Westminster Abbey. Consult his *Works*, ed. by R. W. Sackville-West (London, 1859); and *Gorboduc*, as ed. by W. D. Cooper for the Shakespeare Society (ib., 1847), and by Toulmin Smith in Vollmöller's *Englische Sprach- und Litteraturdenkmäler* (Heilbronn, 1883).

SACO, sä'kō. A river of New England, rising in the White Mountains of New Hampshire, flowing southeast through the southwestern part of Maine, and emptying through Saco Bay into the Atlantic Ocean (Map: Maine, B 8). It passes through the mountains in the famous Crawford Notch, whose sides are formed by imposing rocky peaks. Its course of 160 miles is almost a continuous succession of falls, affording excellent water power. One of these falls is 72 feet high, and the last is but 4 miles from the mouth of the river.

SACO. A city in York County, Me., 15 miles southwest of Portland, on the Saco River, here spanned by four bridges, and on the Boston and Maine Railroad (Map: Maine, C 8). It has Pepperel Park, Thornton Academy, the Dyer Library of 12,000 volumes, the York Institute Library, and a scientific and historical society, with a museum. The Saco River, which falls 55 feet near the city, affords abundant water power. The industrial establishments include cotton mills, cotton-machinery works, and manufactories of brick, box shooks, belting, and carriages. Old Orchard Beach, four miles distant, is a popular summer resort. Population, in 1890, 6075; in 1900, 6122.

The site of Saco was visited by De Monts and Champlain in 1604-05 and by Captain John Smith in 1614, but no permanent settlement was made here until 1631. Until 1762, when it was separately incorporated as Pepperellboro, Saco formed part of Biddeford (incorporated in 1718). In 1805 the present name, which before 1718 had been applied to Biddeford also, was readopted, and in 1867 Saco was chartered as a city. Consult: Owen, *Old Times in Saco, A Brief Monograph on Local Events* (Saco, 1891); and Clayton, *History of York County* (Philadelphia, 1880).

SACRAMENT (Lat. *sacramentum*, sacrament, mystery, engagement, military oath, from *sacrare*, to dedicate, consecrate, from *sacer*, sacred). The name given to certain religious rites of the Christian Church, as to whose number and effects there has been much controversy, especially since the Reformation. According to the traditional and most widely held view, a sacrament is composed of two parts, an outward and visible sign, and an inward and spiritual grace conveyed by the sacrament to those who receive it worthily. This twofold nature is supposed to correspond to the needs of man, as organized with body and soul.

This doctrine is most definitely and clearly taught in modern times by the Roman Catholic Church, though the Eastern churches are in substantial agreement with it. It holds that the sacraments contain grace within themselves as instruments and convey it *ex opere operato*, that is by the fact of the performance of the sacramental act, to those who have the proper dispositions and so place no obstacle in the way of its reception. The *opus operantis*, or the independent act of the receiver, may add to the effect, but does not produce it. The sacraments are seven in number — baptism, confirmation, communion, penance, unction, orders, and matrimony— all of them held to have been instituted by Christ directly. They are divided into sacraments of the dead and of the living; the former class includes those which are held to give supernatural life or sanctifying grace to the spiritually dead—baptism and penance; the latter are supposed to be received by those who are already in a state of grace. Three of them, baptism, confirmation, and orders, are held to impress a certain character or stamp upon the soul, and therefore cannot be repeated; they are administered conditionally if there is any doubt

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of their having been duly received. Besides the matter and form, the intention of the minister is also held to be essential to the validity of any sacrament. There has been much discussion as to the exact sense in which this requirement is to be taken; but all agree that a true inner intention, not necessarily explicit, of performing the act as a religious one is required. If this were denied, it is held that the sacraments would be reduced to the level of mere charms, without any moral responsibility on the part of the minister. A distinction is made between irregular and invalid administration of the sacraments; thus the sacraments administered by a suspended or excommunicated priest would be valid, but not regular, except in the case of a dying person where no other priest was to be had, when such a priest would be allowed to administer them. For the details of the sacraments in their traditional acceptation and use, see BAPTISM; CONFIRMATION; LORD'S SUPPER; PENANCE; CONFESSION; EXTREME UNCTION; ORDERS, HOLY; MARRIAGE.

Under the titles LORD'S SUPPER and MASS the doctrinal and sacrificial aspects of the Eucharist have been covered, but some further details of the history and usages of communion may be given here. The manner of reception has varied considerably at different periods. As to the sacramental bread, the question whether it should be leavened or unleavened has caused acute controversies between East and West. In the modern practice of the Roman Catholic Church it is a thin unleavened wafer, large and stamped with sacred symbols for the celebrant, smaller for the other communicants, and is placed directly in their mouths by the priest. Reception in the hand, which seems to have been usual in the early ages, is now the common rule in the non-Catholic churches. (For the history of the withdrawal of the chalice from all but the celebrant, see COMMUNION IN BOTH KINDS.) The modern dread of bacterial infection has led to the adoption in some Protestant churches of a small separate cup for each communicant. The frequency of reception has also varied, from apparently every day in the apostolic times to once a month, a quarter, or a year. The latter, for Roman Catholics, has been a fixed minimum since the time of the Lateran Council of 1215. In practice with them it is generally preceded by sacramental confession, although there is no strict obligation of this where the communicant is free from mortal sin. The Anglican Church makes provision for the celebration of the sacrament in the sick-room, but by the Roman Catholic practice it is carried from the church to the sick person.

By the majority of the reformed churches the sacraments are held to be merely ceremonial observances, partly designed as a solemn act by which persons are admitted to membership or make solemn professions thereof, partly intended to stimulate the faith and fervor of the recipient, to which disposition alone all the interior effects are to be ascribed. As to the number of rites called by the name of sacrament, almost all Protestants agree in restricting it to baptism and communion, even though they retain as religious observances some of the rites which Catholics regard as sacraments. It is contended, however, by the High Church party in the Church of England that Article XXV., which seems to deny the sacramental nature of confirmation, orders, and so on, does not really do so, but merely asserts that they are not on the same footing with the two great sacraments as generally necessary to salvation.

Consult: Dix, *The Sacramental System the Extension of the Incarnation* (New York, 1893); Oswald, *Die dogmatische Lehre von den heiligen Sakramenten* (5th ed., Münster, 1894); Schanz, *Die Lehre von den Sakramenten der katholischen Kirche* (Freiburg, 1893); and most general works on dogmatic theology.

SACRAMENTALS (Lat. *sacramentalis*, relating to a sacrament, from *sacramentum*, sacrament, mystery, engagement, military oath). A term used in Roman Catholic theology to designate certain rites which partake of the nature of sacraments in so far that they are, if properly used, means of grace, which is conveyed through an external ceremony. While all the sacraments are held to have been instituted directly by Christ, sacramentals are of ecclesiastical institution. The term may be applied either to a material object which is blessed for the purpose or to its employment as a means of grace. A multitude of objects which receive priestly benediction are used in this way: holy water, blessed candles, palms, the ashes used on Ash Wednesday, medals, crosses, and the like, all come under this head. Consult, Probst, *Sakramente und Sakramentalien* (Tübingen, 1872).

SACRAMENTARIANS. The name given in the sixteenth century to those among the reformers who separated from Luther on the doctrine of the Eucharist. Luther taught the doctrine of a mystical presence of the body and blood of Christ along with the bread and wine. (See LORD'S SUPPER; LUTHER.) The first of his followers who called this doctrine in question was Andreas Carlstadt (q.v.); and notwithstanding the protest of his leader, Carlstadt had many followers. The party became so considerable that in the Diet of Augsburg (1530) they presented a special Confession distinct from that put forward by the general body of Protestants, known as the *Tetrapolitan Confession*, because written in the name of the four cities, Constance, Lindau, Memmingen, and Strassburg. It was prepared by Martin Bucer and Wolfgang Capito (qq.v.) and contained 23 chapters. The Confession rejects the doctrine of a corporeal presence, and although it admits a spiritual presence of Christ which the devout soul can feel and enjoy, it excludes all idea of a physical presence. The four cities continued for many years to adhere to the Confession, but eventually they accepted the Augsburg Confession and were merged in the general body of Lutherans. Simultaneous with this South German movement, yet independent of it, was that of the Swiss reformer Zwingli (q.v.), whose doctrine on the Eucharist was that in it the true body of Christ is present by the contemplation of faith, but not in essence of reality. Zwingli himself presented a private confession of faith to the Augsburg Diet, in which this doctrine is embodied. His article upon the Eucharist was in substance embodied in the Helvetic Confession of 1566.

SAC'RAMEN'TO. The principal river of California, draining the northern half of the great central valley of the State (Map: California, C 2). The headstream which bears the name of the main river rises on the southern slope of Mount Shasta, in the northern part of

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the State; but it soon receives from the east the much larger and longer Pitt River, which in the wet season is the outlet of Goose Lake, lying partly in Oregon, and having its headstreams in that State. From the junction the main river flows southward until it meets the San Joaquin River, which drains the southern half of the inland basin. The two unite by several arms, but flow through separate channels westward into the northeastern inlet of San Francisco Bay, whence their waters enter the Pacific Ocean through the Golden Gate. The length of the Sacramento is about 400 miles, but to the source of the Pitt River it is over 600 miles. It is navigable for small vessels to Red Bluff, 300 miles, and for larger steamers generally only to Sacramento, 80 miles. The river receives numerous tributaries from the Sierra Nevada and the Coast Range, on many of which there has been a great deal of gold-mining. The valley of the Sacramento is very fertile, becoming marshy toward the junction with the San Joaquin.

SACRAMENTO. The capital of California and the county seat of Sacramento County, 90 miles northeast of San Francisco, on the Sacramento River, here spanned by a bridge, and on the Southern Pacific and the Central Pacific railroads (Map: California, C 2). The city is noted for the remarkable beauty of its environment. The most prominent feature is the State Capitol, which was erected in 1869, and cost $2,500,000. It occupies a site in the central part of the city and is surrounded by a large picturesque park. Sacramento has three libraries: the State Library of more than 113,000 volumes, the Public Library with 28,000 volumes, and the Odd Fellows' Library. The Christian Brothers' College, Howe's Academy, and Saint Joseph's Academy are the leading educational institutions. There are a fine city hall, court house, United States Government building, Crocker Art Gallery, Roman Catholic Cathedral, Marguerite Home, Protestant Orphan Asylum, the City Dispensary, and the Southern Pacific Railroad Company's hospital. An annual fair is held at Sacramento under the auspices of the State Agricultural Society, which maintains here a handsome exhibition building, and a park and racecourse.

The valley of the Sacramento, in which the city is situated, is one of the most productive sections of the State, yielding large quantities of wheat, and various fruits. Manufacturing is extensively carried on, the various establishments, in the census year of 1900, having had an invested capital of $7,369,013, and an output valued at $11,141,896. There are flouring and grist mills, foundries and machine shops, harness and saddlery factories, slaughtering and meat-packing establishments, breweries, and manufactories of carriages, furniture, soap, crackers, and lumber products. Shops of the Southern Pacific Railroad also are here. The water works are owned and operated by the municipality. Population, in 1890, 26,386; in 1900, 29,282.

In 1839 Captain John A. Sutter, having obtained from the Mexican Government a grant of a large tract of land in this vicinity, built here a fort which he called New Helvetia. This fort, which has been rebuilt and is preserved for its historic interest, was the first point in California reached by miners coming from the East in 1848. In this year a village called Sacramento was laid out. The land was originally only 15 feet above low water, and destructive floods occurred in 1850, 1852, and 1853. Subsequently levees were built and the general level of the land raised, the city now being eight feet higher than when first settled. Terrible fires occurred in 1852 and 1854, the first causing a loss of $5,000,000 and the second one of $650,000. Sacramento was incorporated as a town in 1849, became the State capital in 1854, and was chartered as a city in 1863.

SACRAMENTO PERCH. A bass-like fish (*Archoplites interruptus*) of the Sacramento and San Joaquin rivers and tributary lakes—the only fresh-water percoid west of the Rocky Mountains. It is an excellent food-fish, from one to two feet in length, dark-colored, with the sides marked with about seven irregular dark bars. This fish is liable to be exterminated by the carp and catfish, which infest its spawning grounds. See Plate of PERCHES.

SACRAMENTO PIKE. A large, greenish chub, two to four feet in length (*Ptychocheilus Oregonensis*), which abounds in the rivers of the Pacific Coast, and is used as food. Other names are 'squaw-fish' and 'chappaul.' See Plate of DACE AND MINNOWS.

SACRED HARMONIC SOCIETY OF LONDON. An important English musical organization, organized in 1832 for the performance of oratorios and sacred music generally. It became famous for its extraordinary performances of Handel's work at the Handel festivals, which were begun in 1857 at the Crystal Palace, Sydenham, and which have been held triennially with one exception since 1862. As many as three thousand singers have frequently been assembled with an orchestra of 500 pieces. In the triennial festival of 1900, 4000 performers participated. Sir Michael Costa was conductor of the society from 1848 up to the time of his death.

SACRED HEART, LADIES OF THE. A religious society of the Roman Catholic Church, founded at Amiens, France, in 1800, by Madeleine Sophie Barat and Octavie Bailly, under the direction of Father Joseph Désiré Varm, S. J. The object of the society was the education of young ladies of the higher classes. The constitution was approved by Leo XII. in 1826; a house was opened in Rome and branches established in many cities. The first house in the United States was established by Bishop Dubourg in 1817, near Saint Louis. The society has now over 100 houses in various parts of the world, and 5000 members. The mother house is in Paris. For the story of its beginning, consult Baunard, *Histoire de Mme. Barat* (Paris, 1876).

SACRED HEART, LEAGUE OF THE, or APOSTLESHIP OF PRAYER IN LEAGUE WITH THE SACRED HEART OF JESUS. A pious confraternity founded at Vals, in France, 1844, by Father Gautrelet, of the Society of Jesus, with the intention of cultivating an apostolic spirit among the young Jesuit students who were in the seminary there preparing for the mission. It soon spread throughout France and thence to other countries and to the missions. Gautrelet's foundation was organized and perfected by Father Henri Ramière, S. J., who also gave it renewed life and vigor and founded the *Messenger of the Sacred Heart of Jesus*, as a monthly organ of the association. This was soon reproduced in several

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languages and circulated throughout the world. Pius IX. granted the association many indulgences and the Congregation of Bishops and Regulars at Rome approved of its statutes in 1866. After this it grew very rapidly. Leo XIII. revised its statutes in 1896. At present there are throughout the world over 60,000 local centres aggregated to the Apostleship of Prayer and its membership is estimated at 30,000,000. There are 6000 local centres in the United States and about 4,000,000 associates. The purpose of the organization is by prayer to unite with the efforts of missionaries throughout the world for the conversion of souls and for the betterment of true believers. A special director for each country is appointed and the *Messenger of the Sacred Heart* appears in about thirty different editions, printed in fifteen languages. Consult: *Manual of the Apostleship of Prayer* (33d ed., New York, 1900); Ramière, *Apostleship of Prayer* (Eng. trans., ib., 1890).

SACRED HEART OF JESUS, FEAST OF THE. A festival of the Roman Catholic Church celebrated on the Friday after the octave of Corpus Christi. The feast of the Sacred Heart originated in the latter half of the seventeenth century, and was established because of certain revelations made to Marguerite Marie Alacoque, a French nun of the Order of the Visitation, who lived at Parayle-Monial in Burgundy. She related that the Saviour appeared to her on a number of occasions, showed her His wounded heart, and bade her institute a new office in His honor. The devotion to the Sacred Heart was gradually propagated in France, and at length was approved by Pope Clement XII. in 1732 and more formally in 1736, and by Clement XIII. in 1765. The spread of the Apostleship of Prayer in League with the Sacred Heart of Jesus (see SACRED HEART, LEAGUE OF) has given a fresh impulse in recent years to this devotion. In 1899 Leo XIII. lent the full weight of his supreme approbation to the devotion by consecrating the whole Christian Church in a special manner to the Sacred Heart. Consult Gallifet, *The Adorable Heart of Jesus* (New York, 1887).

SACRED MUSIC. From the very earliest times music has been connected with the religious cult of all nations. The part it has played in the religions of the Egyptians, the Greeks, and the Hebrews is discussed under EGYPTIAN MUSIC, GREEK MUSIC, and HEBREW MUSIC; the present article treats merely of sacred music as it is identified with Christianity. The early Christian Church adopted its music from the Hebrews. Besides the liturgy hymns were also used. When, toward the end of the fourth century, antiphonal singing was introduced in the rendering of the psalms, they were regarded as a class by themselves, because two choruses answered each other; whereas in the hymns the entire chorus sang all the verses. Psalms were always preceded by an *antiphon*, a short piece written in the same tone as the following psalm. Harmony at that time was unknown and the music consisted of a kind of recitation known as 'plain chant.' About the end of the fourth century Saint Ambrose collected the various chants used in the Church, arranged them systematically and promulgated certain rules for their proper execution. He is also credited with the introduction of the four *authentic modes*. (See MODES.) Afterwards the Hellenic popes added many new hymns and distributed the various chants so as to cover the services for the entire Church year. They likewise increased the modes by the addition of the four *plagal modes*. When polyphonic music arose, composers selected their texts entirely from the liturgy of the Church. The old plain chant melodies became the *cantus firmus*. But soon popular melodies were introduced. The famous vesper canticle *Magnificat* received its first polyphonic setting probably by Josquin des Près (d. 1500). After the invention of the discant (see MUSIC, SCHOOLS OF COMPOSITION) it was customary to sing the alternate verses in plain chant and fauxbourdon. Josquin and the earlier polyphonic masters, including even Palestrina, were influenced by this custom to such an extent that they retained the plain chant for the odd verses and composed only the even verses.

Bach's Mass in B minor marks the modern method of the composition of masses. Modern masses no longer exhibit characteristics of schools, but of individual composers. Although we have polyphonic masses dating from the fourteenth century, the mass for the dead, the *requiem*, attracted the attention of composers much later. The first great polyphonic requiem was written by Palestrina. The character of some modern requiems approaches that of the oratorio.

In connection with the development of the mass we find the form of the *motet*, first cultivated by De Vitry about 1300. The text was always Latin selected from the offices of the Church. When the school of the Netherlands (see MUSIC, SCHOOLS OF COMPOSITION) was at its height, every composer of note wrote one or more masses, each bearing the name of the popular melody which was used as a cantus. In the course of time this practice led to abuses, and seriously detracted from the dignity of the Church style, so that the Council of Trent appointed a commission of cardinals and musicians of the Papal Chapel to restore Church music to its original purity. At no time had the plain chant been discontinued. In fact, it was the only music that had ever been officially sanctioned by the Church. At this crisis Palestrina came forward and composed three masses in the polyphonic style. The commission decided that the contrapuntal art was not incompatible with the dignity and simplicity essential to Church music. Palestrina continued to compose masses in this style and also set to music the services used during Holy Week, the *Lamentation* and *Improperia*. All these works of Palestrina and the other masters of the Roman school were written strictly *a capella*, i.e. without instrumental accompaniment. This style has ever since been known as the Palestrina style. The masters of the Neopolitan school introduced the orchestra into the Church, and thus brought about a new style in which the individuality of the composers found greater freedom of expression. See MUSIC, SCHOOLS OF COMPOSITION.

The Reformation wrought a great change in the forms of Church music. The introduction of congregational singing gave rise to the *chorale*. At first popular melodies were taken and adapted to German words; then composers began to write original melodies. In England Protestant composers took the form of the motet and wrote their music to English words. Thus arose the

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anthem. In 1559 by a decree of Elizabeth the anthem became an essential element in the Anglican ritual. In respect to form a distinction was soon made between the *full anthem* and the *verse anthem*, the former containing more choral writing, the latter more solo numbers. In Germany the anthem was developed by the immediate predecessors of Bach into the *Church cantata* (Kirchenkantate), and Bach himself marks the culmination of this form. Bach's cantatas are more elaborate than the anthems, especially in the treatment of the instrumental accompaniment.

Independent of the Church service there arose the form of the *oratorio*. Catholic composers originated this form about 1575, and German and English Protestant composers adopted it. The German masters confined themselves in the selection of the texts to the Passion of Christ, as related in the Gospels. They introduced the character of the *narrator* and made free use of the chorale, thus adding an element of pious contemplation. In this form the oratorio became the *Passion oratorio*, or, briefly, the *Passion*. The perfection of this form is reached in Bach's *Passion According to Saint Matthew* (1729). See AMBROSIAN CHANT; ANTHEM; ANTIPHON; CANTUS FIRMUS; CHORALE; HYMNOLOGY; IMPROPERIA; MASS; MODES; MOTET; ORATORIO; PASSION; PLAIN CHANT; POLYPHONY; REQUIEM; SEQUENCE; STABAT MATER.

SACRED ORDER. A Siamese order for members of the royal line, founded in 1851 and reorganized in 1869. It had previously been a personal decoration of the King. The insignia comprises a rosette surmounted by a crown and set with nine different jewels. The ribbon is yellow, edged with red, blue, and green.

SACRED WARS (Gk. *ἱεροὶ πόλεμοι, hieroi polemoi*). The name given to the wars waged at the instigation of the Amphictyonic Council in Greece in behalf of Delphi. On the ground that the Phocian cities of Crissa and Cirrha had maltreated women returning from the shrine, and had exacted too heavy toll from pilgrims to Delphi, war was made on Cirrha about B.C. 596-586 and the city was destroyed. About B.C. 357, the Phocians were charged with having cultivated ground sacred to Apollo and were heavily fined by the Amphictyonic Council. They retaliated by seizing Delphi, and by the aid of the treasure prolonged the war for ten years, when they were finally overpowered by Philip of Macedon, and their towns dismantled. On a similar accusation made in B.C. 339 by Æschines, the Amphictyons declared war against the Locrians, and made Philip commander-in-chief. When his operations seemed to be directed against Athens, Demosthenes succeeded in forming an alliance with the Thebans and the struggle ended in the battle of Chæronea, which put Greece at the feet of Philip. A war between the Phocians and Delphians in B.C. 448 also figures as a sacred war.

SACRED WAY (Lat. *via sacra*, Gk. *ἱερὴ ὁδός, hierē hodos*). (1) A famous road leading from Athens northwest to Eleusis. It issued from the city at the Dipylon Gate, passing through the Ceramicus and continuing through the Pass of Daphne. It was the route of the great annual procession of the mysteries, and was for the greater part of its length lined on both sides with tombs, many of which are preserved, together with remains of shrines and temples. (2) The most important street of the ancient Roman Forum, forming the chief means of communication with the Capitol. Starting near the Meta Sudans in the hollow of the Colosseum, it passed between the Palatine and Oppian, some 150 yards north of its later line, leading through the Arch of Titus, thence diagonally between the Temple of Vesta and the Regia to the Vicus Tuscus, past the Basilica Julia to the summit of the Capitoline, a total length of about 860 yards to the foot of the ascent, which in Imperial times was called the Clivus Capitolinus. The road received its name from the three sacred huts of Vesta, of the high priest, and of the Penates brought from Troy. In early times it was divided into three sections, *infima, summa*, and *clivus sacer*. Its classic name was retained down to the ninth century.

SACRIFICE (Lat. *sacrificium*, sacrifice, a making sacred, from *sacer*, sacred + *facere*, to make). An offering to a spiritual power of something consumed in the service of that power. The word therefore includes the rite and the thing that is sacrificed, but excludes in the latter case, except when used metaphorically, such objects as are made over to a deity without being consumed (lands, temples, etc.). The deity is supposed to eat the sacrifice or its essence, sometimes only the blood (life) of the victim. In the developed ritual a sacrifice is generally made by an appointed priest (q.v.). Not all priests, however, are sacrificers. Sacrifices are sometimes divided, as among the Romans, into honorific and piacular. In either case the motive in making a sacrifice is the counterpart of that which induces a man to make an offering to another man. Thus the sacrifice is a means of benefiting, a token of esteem and brotherhood, or it is a palliation of actual or potential anger. The simplest form of sacrifice is when grain is flung upon the ground for spirits, either ancestral ghosts or goblins. But as this is usually the accompaniment of a family meal, so a great feast in honor of gods is merely an extension of the same idea. Such a sacrifice may be either vegetable or animal. Both kinds are enumerated in the Gudean tablets, and since both are offered to-day by savages, as they were common in classical antiquity and were known to the Aryans from a still more remote period, it is probably impossible to derive one from the other. There is, further, besides the simple vegetable sacrifice, the sacrifice made by offering intoxicating liquor, usually as an accompaniment of a feast, such as the beer sacrifice to Wuotan, the Soma sacrifice to Indra, and parallel offerings and rites among the Aztecs. Among animal sacrifices, as man is the best animal, human sacrifices have always held a prominent place. They were common among the Semites, not unusual among the Greeks and Romans (in a veiled form), and from time immemorial have been performed in India. The worshipers in some Saiva rites still eat of this sacrifice and many peoples are cannibals only at a time of sacrifice. The fruit sacrifice is sometimes clearly an afterthought, typifying a revolt against the cruelty of animal sacrifice. Thus in the Vishnu cult of India only vegetable sacrifices are permitted. In such a case, for animals are substituted cakes in the likeness of animals; or small animals first take the place of large animals and are in turn exchanged for effigies (as

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in some Brahmanic rites); or, instead of being sacrificed, a victim is only beaten or otherwise maltreated, as in expiatory rites. The same notion survives in the mutual abuse of festivals, originally a means of purification.

In cases of piacular sacrifice, the gift serves as an atonement. This gift is usually the life (blood) of the sinner or of his substitute, but it may be merely a dish of food. In a totem system, the sin committed by the clan is often expiated by the sacrifice of some man or animal of the clan. In proportion to the god's anger the gift must be precious, and even the chief of the clan or his children must suffer. But piacular sacrifice may be made without any such notion and then a stranger or slave is sacrificed, as in the *mom-i-ai* rites, when victims are offered to atone for erecting bridges, building foundations, and the like. No sacrificial altar is needed for primitive rites, but as gods are or dwell in stones, fire, or water, gifts are made at the stone or thrown into the fire or water. In the former case, however, even after the conception of the divinity has changed, and the god is supposed to live in heaven, he is still imagined either to come to the stone or to smell the sacrifice offered thereon. Many religions, moreover, have the extension of piacular sacrifice known as the scapegoat. In this conception sin, like disease, clings to a man, but may be put off upon some one else, who is either driven away burdened thus with sin or is slain for the real sinner. The proxy sacrifice is a redeemer. In the Brāhmanas we read that an animal sacrifice on a certain occasion represents a man who has 'bought himself off' by means of the animal. A tale of the same period recounts that a man who had been promised as a sacrifice to a god 'bought himself off' by purchasing another man for 1000 cows to serve as a redeemer. Redemption implies atonement, but atonement does not imply redemption. The mystical sacrifice of the Greeks, Semites, Mexicans, and other races is always an atoning sacrifice, and the victim represents the offended deity because the clan is of his blood; and by partaking of this blood, which symbolizes life, the clan renew their strength in communion with their god. (For various Christian views of the sacrifice of Christ and its effect, see ATONEMENT.) According to the view of the Roman Catholic and Eastern churches, Christianity is still, by the daily re-presentation of the one offering of Christ, essentially a sacrificial religion. For an exposition of this view, see MASS.

The piacular sacrifice has been explained by Robertson Smith as a development from a totem offering, consisting originally in smearing a bethel with wine and blood, in which the life of a member of the brotherhood is required (whereas in the commensal meal there is a feast). According to some scholars, all sacrifices have their origin in the same cult, but this is a great exaggeration. Sacrifice, whether as piacular or honorific, may be an offering of alien life, and it is impossible to derive from totemism the jollification of a drunken debauch in which the gods are invited to share. Inside the province of totemism sacrifice may be honorific or piacular, and in neither case is it necessary (although in the latter case it is common) to sacrifice a clan-member. Disregarding the totemic sacrifice, we have a mass of evidence pointing to the fact that sacrifice may be without implication of any blood-fellowship. Sometimes there are symbolic sacrifices. There can be no doubt, for example, that thuggery belongs to this class. The goddess of thuggery is the Dravidian mother-monster, to whom as symbolizing the reproductive power of nature (a different notion altogether from that of totemism) phallic rites are performed; but as representative of life human victims are offered to her. In the holocausts offered to the Aztec deities there is no expiation, but only propitiation by means of victims sometimes alien and sometimes native. The human sacrifice offered by the Assamese and by the Khasis, or again by the intermediate Nāga tribes, are both expiatory and propitiatory. The Khasis, for example, kill (and eat) a stranger as a piacular rite to Thlen (the dragon); the Nagas expiate sin by sacrificing slaves (not of the same stock) and enemies captured in battle; and in Assam the privileged victims (feasted and petted till execution, as in Mexico) are strangers, though they are piacular as well as honorific victims. Such cases point to a wider conception of sacrifice than that put forward by those who deduce all sacrifice from one origin. The god earth, the only chain binding together all the Khond tribes in India, is a malignant demon, and propitiatory blood-sacrifice is made to him, but only to symbolize rain withheld by the demon, as the tears of the Aztec children symbolized rains ('sympathetic magic'). In its simplest aspect sacrifice is a gift intended to propitiate any spirit and not a renewal of a blood-bond nor an expiatory rite. Demonolatry has its sacrifices, and they are the earliest known as they survive to-day among such primitive savages as the Mishmis, who have no idea at all of a good god, but propitiate a demon with offerings. The motive of the sacrifice is to please as well as to benefit the spirit.

In view of the facts here cursorily considered, instead of starting with the assumption of totemism and endeavoring to explain all sacrifices as either a totemic commensal feast on a hostile victim or a piacular rite, it will be better to divide sacrifices into three main classes, as follows: (1) offerings made to goblins, ancestral spirits, or other spiritual powers, to propitiate them, such as grain to the Bhūts ('beings') and tithes to a king-god; (2) offerings made as a feast to great gods (distinguished guests), the sacrifice consisting of vegetables or of animals, or human aliens, often of intoxicating liquor; the idea of both (1) and (2) being that of a friendly gift, though (2) may in a totemic environment be a brotherhood feast; (3) sacrifices, either vegetable or animal, made to expiate sin. In a totemic environment a clan-member is the victim, but often an alien; in many cases only the life is demanded and the flesh is not eaten when an animal (including man) is sacrificed. These forms are not always distinguishable. A cannibal feast may be expiatory and may not be a commensal feast with the god. On the other hand, it may be commensal with the god and yet expiatory. As a general thing, piacular sacrifice is not primitive, but secondary, when ethical feeling is developed. Among savages sin against a god has no ethical side. A demon's wrath is simply inferred from trouble presumably caused by the god. The sacrifice is not to remove sin, but to avert anger, the usual cause of anger being a supposed neglect of the god, who has not enough food to satisfy him.

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There are many savage tribes who thus offer sacrifice to goblins, gods, or demons whom they regard as quite apart from the clan-life, merely to be on good terms with a power susceptible to such bribery. Besides benefiting or revering a spirit, a third motive lies in pleasing a god by depriving one's self of something valuable; but this is included in the gift notion, which may be inspired by this idea rather than by the notion of benefiting the god. Consult: Robertson Smith, *Religion of the Semites* (new ed., London, 1894); Jevons, *Introduction to the History of Religion* (London, 1896); Tiele, *Gifford Lectures* (New York, 1897-99); Frazer, *The Golden Bough* (3 vols., revised ed., London, 1900); Tylor, *Primitive Culture* (New York, 1874); and see the articles NATURE-WORSHIP; SHAMANISM; and TOTEMISM.

SACRIFICE AMONG THE HEBREWS. The Old Testament presents sacrificial customs belonging to at least three different periods, the Pre-Mosaic, the Mosaic, and that which resulted in the Post-Exilic ritual; there are also many references to alien rites which intruded into the Israelitish religion. The Hebrew sacrificial ideas are of common origin with those of the other Semites, and may have been influenced by the Babylonian religion, but withal the Hebrew system was original enough to make its own selection and to develop in its own way. The materials of sacrifice were of two kinds, flesh and vegetable. In the former the Jewish ritual is distinguished by the limitation to domestic food-animals, namely, the bull, sheep, goat, turtle-dove, and pigeon. As the most valuable food and as the most typical because of its life, flesh was the preponderating element of sacrifice, and *Zebakh*, meat sacrifice, is the general word for sacrifice. The vegetable sacrifices consisted of all cultivated vegetable products, either in the raw state or in cakes of flour kneaded with oil and salted, also sometimes incensed. In the later ritual there is no libation of wine or oil, and leaven or other fermenting component was tabooed, with one exception (Lev. vii. 12). The sacrifices may be divided into three classes: the tribute sacrifice (*minkhāh*, 'oblation'); the commensal (*shelem*, 'peace-offering'); the propitiatory, divided into several classes. In the first kind the worshiper rendered back to God, as the liege lord of the land, a typical part of his bounties. This included the first-fruits (q.v.) and the tithes of his fields and flocks; the matter of the sacrifice fell to the ministers of the sanctuary. The commensal sacrifice consisted in the sacrifice and the consumption by family or clan of an animal; it involved a sacramental meal, with all the necessary accompaniments of a banquet, bread, wine, etc. The Passover is an example. Here the primitive idea was of the common consumption by the divinity and his people of the same food, the portion consumed in the flame and the blood spilt on the ground being the god's portion, the rest of the carcass being that of the worshipers. While this was the prevailing sacrifice earlier, the later code made it yield to the third kind, the propitiatory. With the growth of ethical consciousness and of the sense of guilt toward offended Deity, and with the development of the transcendental idea of God, the festal, sacramental character of sacrifice was replaced by a solemn act of animal sacrifice to God, in which at the most only the priests shared. Such rites 'atone for' human sin, by propitiating God. At the same time, they were effective only for the general frailty of the Church or for unwitting sins of individuals, never for willful sin. Here are several classes, in all of which the blood appears as the atoning element. First, there is the whole burnt-offering (*'ōlāh, kālīl*), in which class belonged the stated daily sacrifices. Secondly, the sin-offering (*khaṭṭāth*), in which the fat was offered in fire, the flesh being burnt without the sanctuary, or, in individual offering, falling to the priest. To this class belonged the supreme sacrifice of the later ritual, that of the Day of Atonement. The guilt or trespass offering was accompanied with a restitution for some specific offense. To this general department also belong the sacrifices of purification. In early times the sacrificer was the *paterfamilias*, chieftain, or king; in the later development sacrifice was confined to the Aaronic priesthood. Consult the Epistle to the Hebrews and the fifth division of the Mishna; Kurtz, *Der alttestamentliche Opferkultus* (Mitau, 1862; Eng. trans., *Sacrificial Worship*, Edinburgh, 1863); the archæologies of Ewald, Benzinger, Nowack, and the Old Testament theologies of Dillmann, Smend, and Shulz; Edersheim, *The Temple and Its Ministry* (London, 1874); Wellhausen, *Reste des arabischen Heidenthums* (Berlin, 1887); Robertson Smith, *Religion of the Semites* (London, 1894). For conspectus of Levitical laws, see Carpenter, *Hexateuch* (London, 1900, 1902).

SACRIFICE AMONG THE GREEKS AND ROMANS. With the Greeks, sacrifice offered to the gods of the upper world was a share in the daily or public meal, a rendering to them of a portion of the good things enjoyed by men. It is probable that in a sense every slaughter of a beast for food was accompanied by an offering of some parts of the animal to the god. In these bloody sacrifices there were many differences in the ritual, depending on the city, the god, and the period, but the main features of the common rite show no great variation. The victim was adorned with garlands and fillets, and the horns of cattle were frequently gilded. A basin of water was consecrated by plunging into it a brand from the altar, and the spectators, animal, and altar were sprinkled. Then barley groats mixed with salt were passed about, strewn on the victim, and thrown by those present into the fire. Hair was then cut from the brow of the animal and thrown into the fire, thus dedicating it to death. Then in solemn silence the victim was killed by cutting the throat, with the head turned back so that the blood might spurt upward. Large animals were first stunned with an axe. The blood was thrown on the altar, and parts of the entrails, bones, and a little flesh, along with incense, burned for the gods. From these sacrifices must be distinguished those offered to the gods of the lower world, to the heroes or the dead, where the blood was allowed to flow into the earth, and the entire victim was consumed or otherwise destroyed, as when animals were cast into the sea, rivers, or subterranean caverns. In these offerings we find dogs and animals unfit for food sometimes slain. Besides these bloody sacrifices, unbloody offerings of fruits, wine mixed with water, honey, milk, and especially cakes, were very common. Cakes in the form of animals were used by the poor

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as substitutes for the more expensive victims. No wine was ever offered to the gods of the lower world. Their libations were honey, milk, and water. At some altars only bloodless offerings were allowed.

Among the Romans offerings were made daily and on special occasions by the family to the Lares, Penates, and other household gods. In their simplest form these consisted of the articles of daily food, milk, wine, beans, grain, cakes of many shapes and sizes, garlands, firstfruits of the flock or field, or incense. Similar were doubtless the public offerings of the early religion, and this simplicity was long preserved, accompanied by an elaborate and minute ritual. Thus in certain sacrifices the victim must be slain by a flint knife; elsewhere only hand-made earthenware vessels could be used, or the grain must be pounded, not ground. The swine was perhaps the commonest animal sacrificed, and the great offering was the Suovetaurilia (q.v.), or boar, ram, and bull. In the developed ritual the state sacrifices were usually bloody, and the choice of the animal was regulated by minute rules, which prescribed the color, age, and sex, as well as the kind of victim appropriate to the god or the occasion. Horses were only offered to Mars; for the gods of the lower world black or dark victims were prescribed, and white cattle for Jupiter and Juno as gods of the heaven; in the latter case we find that chalk sometimes helped nature in securing the needful color. While the old ritual seems to have prescribed very modest sacrifices, the later custom added extra victims, *honoris causa*, and often in great numbers. The ceremonial of the sacrifice consisted in a careful inspection of the victim, which was then brought to the altar decked with garlands, ribbons, and fillets. Here the offerer first threw incense and wine into a fire by the altar, and then symbolically slew the victim, the actual killing and cutting up being performed by servants. The *exta* (heart, lungs, liver, etc.) were carefully examined to see that they were perfect, then cooked, and offered on the altar to the god; the remainder of the animal was eaten by the priests and officials, or, in the case of private sacrifices, by the worshiper and his friends. In the case of foreign gods other rituals, especially the 'Greek rite' (*græcus ritus*), were followed. For the literature, see the articles on GREEK and ROMAN RELIGION.

SACRISTAN (OF., Fr. *sacristain*, from ML. *sacristanus*, sexton, from *sacrista*, sacristan, from Lat. *sacer*, sacred). A title applied in the Roman Catholic and Anglican churches to the official who has the care of the sacristy and the sacred vessels, vestments, and other valuables contained in it. The duties of the sacristan were originally performed by a separate class of clerics, who constituted the lowest of the four minor orders. (See OSTIARIUS.) The term sacristan has become corrupted into sexton, and the two terms are sometimes used interchangeably, although the sacristan proper has a more responsible office. In cathedrals and collegiate churches he is usually a dignitary of the chapter—in the English cathedrals one of the minor canons.

SACRISTY (ML. *sacristia*, vestry, from *sacrista*, sacristan). An apartment attached to a church, in which are kept the sacred objects used in the public worship, and in which the clergy and other functionaries who take part in the service assemble and prepare for the ceremonies on which they are about to enter. In many European churches the sacristy is a spacious and costly building. Anciently there was a distinction between the sacristy, where the vestments were kept, and the treasury, where the books and vessels were guarded, these two chambers being placed on the right and left of the apse of the church, where they were replaced in the Middle Ages by the side-apses and chapels. Many church sacristies in Europe are still small museums.

SAC'ROBOS'CO, JOHANNES DE, JOHN OF HOLYWOOD, or HALIFAX (?-1256). An English mathematician, probably born at Halifax, in Yorkshire. He was educated at Oxford, entered the University of Paris about 1230, and afterwards became professor of mathematics and astronomy there. Sacrobosco was among the first scholars of the Middle Ages to make use of the astronomical writings of the Arabians. His treatise *Tractatus de Sphæra Mundi* is a paraphrase of a portion of Ptolemy's *Almagest* (see ALMAGEST), and no book enjoyed greater renown as a manual among the scholastics. First published in Ferrara in 1472 (an edition now very rare), it passed through twoscore editions with many commentaries. Sacrobosco's work on arithmetic, *Tractatus de Arte Numerandi* (printed without place and date), variously called *Opusculum de Praxi Numerorum quod Algorismum vocant* (1510) and *Algorismus Domini Joannis de Sacro Bosco* (1523), contains the nine Hindu digits and the zero. He also wrote *De Anni Ratione* (1550). Consult: Eneström on Sacrobosco's arithmetic, in *Bibliotheca Mathematica* (1894); Halliwell, "Tractatus de Arte Numerandi," in *Rara Mathematica* (London, 1839).

SACRUM (Lat., sacred), or OS SACRUM. A triangular bone situated at the lower part of the vertebral column (of which it is a natural continuation), and wedged between the two innominate bones so as to form the keystone to the pelvic arch. It is readily seen to consist of five vertebræ with their bodies and processes, all consolidated into a single bone. Its anterior surface is concave, not only from above downward, but also from side to side. The posterior surface is convex, and presents, in the middle vertical line, a crest, formed by the fusion of the spines of the vertebræ, of which the bone is composed. The last sacral vertebra has, however, no spine, and the termination of the vertebral canal is here very slightly protected.

SACY, sâ'sê', ANTOINE ISAAC, Baron Silvestre de (1758-1838). One of the greatest of French Orientalists. He was born in Paris, began the study of Hebrew at the age of twelve, and gradually acquired an extensive knowledge of Semitic and Iranian languages. Being intended for the civil service, he studied law, and in 1781 was appointed counselor of the mint. In 1785 he was elected a member of the Académie des Inscriptions, and rendered valuable service as member of a committee to publish unedited manuscripts in the royal library. During the Revolution he lost his position. He had already begun the decipherment of the Pehlevi inscriptions of the Sassanian kings, and in 1793 published his *Histoire de la dynastie des Sassanides*, translated from the Persian, with four dissertations. In

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1795 he was appointed professor of Arabic in the newly founded Ecole des Langues Orientales, in Paris. In 1806 he became also professor of Persian at the Collège de France, and in 1808 was elected a member of the Corps Législatif. He was given the title of Baron in 1813, and in 1832 became a peer of France. With Abel Rémusat he founded the Société Asiatique in 1822. De Sacy greatly furthered the study of Arabic by his text-books: *Grammaire arabe* (1810; 2d ed. 1831); *Chrestomathie arabe* (1806; 2d ed. 1826), and its supplement, *Anthologie grammaticale arabe* (1829). Other noteworthy works were: *Principes de grammaire générale* (1799; 8th ed. 1852); a translation of Abd ul-Latif's *Egypt* with notes (1810); an edition of the Arabic book of fable, *Calila et Dimna* (1816), and of Farid-ud-din Attar's *Pendnâme*, with translation and an Arabic preface written by himself (1819); *Mémoires d'histoire et de littérature orientales* (1818), the *Makamât* of Hariri (1822; 2d ed. 1847-53); *Exposé de la religion des Druzes* (1838). There are biographies of De Sacy by Reinaud (Paris, 1838) and H. Derenbourg (ib., 1895).

SADDLE MOUNTAIN. The culminating group of the Taconic Mountains in northwestern Massachusetts. The highest peak is Mount Greylock, 3533 feet, the loftiest mountain in the State.

SADDLERY (from *saddle*, AS. *sadol*, OHG. *satal, satul*, Ger. *Sattel*, perhaps a Slavic loan-word, cf. OChurch Slav. *sedlo*, saddle; ultimately connected with Skt. *sad*, Gk. *ἕζεσθαι, hezesthai*, Lat. *sedere*, OChurch Slav. *sĕsti*, Goth. *sitan*, AS. *sittan*, OHG. *sizzen*, Ger. *sitzen*, to sit). The general furniture of horses.

An ordinary harness consists of leather straps, simple or padded, and of the various rings and buckles with which these straps are united and fastened. With the invention of the leather-sewing machine, the process of making harness has been greatly simplified. In general the parts of a harness are: Crown, blinders, throat-latch, front, cheek-piece, nose-band, bit, curb, check, and reins; the saddle, to which the terrets or rings are attached through which the reins pass and to which the check-rein is also attached; the crupper, a strap to secure the saddle in place, passing over the back of the animal and around its tail; the collar; the hames, which are fastened to the collar; the hame-link and the hame-strap, to which the traces are fastened; the pole-strap; the martingale, a strap to hold the horse's head down, which runs from the belly-band between the front legs to the bit or nose-band; the belly-band turn-back; the trace-tug, a loop depending from the saddle, which in a single harness supports the shaft and in a double harness the tug; the traces, sometimes also called tugs, which connect the collar with the swingletree; the hip-strap; and the breeching, or strap passing around the buttocks of the animal and attached to the shafts or pole, to enable him to back the vehicle or hold it back on a down grade.

The earliest known saddles were those which have been found in Egypt, which were not used for riding, but as the part of a draught harness which bears the load. Probably to the ancient Egyptians, as to the ancient Greeks and Romans, equestrian saddles were unknown. The forerunner of the saddle was the pad or saddle-cloth, which was secured to the horse's back by one, two, or three girths. These seats, however elaborately padded, differed from the true saddle in having no tree. Saddles with trees did not come into use among the Romans till about the fourth century A.D. *Stirrups* did not come into use till three centuries later. Previously the rider mounted from a horse-block, or with the aid of his spear, and the Roman cavalry were subject to various ills caused by having their legs hanging for hours from the horse's back. *Side saddles* were introduced as early as the twelfth century. They were developed from the pillion or pad on which a lady rode sidewise behind her husband and steadied herself by holding on to his belt. The present type of side saddle seems to have come into vogue about 1650, but the third pommel or leaping horn, by which a firm grip is secured, did not appear till 1830.

The saddles of different periods and among various nations differ much in their form and construction. The parts of a saddle are: the tree or foundation, consisting of the pommel or horn-like projection at the front of the saddle, the cantle or hind-bow, and the side bars; the padding, which is sometimes, as in the McClellan saddle, entirely omitted; the skirts, seat, and girth; the stirrups, which are attached to the side bars; the crupper, which is attached to the cantle. The tree is usually of wood, although in the French cavalry saddle it is of iron. It is fastened together with tenons and mortises and secured by a covering of canvas or rawhide, which is tacked on wet and then allowed to shrink. The outer covering is usually of pigskin. Besides the saddle for horses, there are specially constructed saddles for other draught animals, as oxen, camels, and elephants. The *pack saddle* is shaped to hold securely the largest possible load. To increase its capacity *panniers* are sometimes added.

SAD'DLEWORTH. A woolen-manufacturing town in the West Riding of Yorkshire, England, 11 miles southwest of Huddersfield. Population, in 1891, 13,475; in 1901, 12,300.

SADDUCEES (Gk. *Σαδδουκαῖοι, Saddoukaioi*, from Heb. *Ṣaddûḳîm*). The conservative and aristocratic party in the late Jewish commonwealth. The name is now generally derived from Zadok, high priest in Solomon's reign, from whom the later high-priestly line was derived, and whose descendants, 'the sons of Zadok,' according to Ezekiel's programme, were the only legitimate priests. (See LEVITE; PRIESTS.) Although this narrow restriction to the line of Zadok was not finally maintained, this family was the great majority in the later priesthood and formed its aristocratic and controlling element. This etymology agrees with the actual character of the Sadducees, who were the party of the priestly aristocracy as over against the democratic Pharisees (q.v.). The sharp distinction between the two was not made till the time of the Asmonean house in the second century B.C., but its origins go back to the fifth century, when, as we see in the book of Ezra-Nehemiah, a division began to arise between the priests who were the ministers of the cultus and hence a privileged and conservative class, and the Scribes (q.v.), who, although loyal to the cult and its ministers, were nevertheless interested in making the law the rule of life for the whole people. The Maccabean or

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Asmonean house (see MACCABEES) was itself of priestly origin, but accomplished its work through the help of the patriotic and religious party, which now came to the fore. But the ambition and worldly interests of this dynasty, which united in itself the high-priesthood and the monarchy, soon alienated the rigorous or Pharisaic party, and in the latter part of the reign of John Hyrcanus (B.C. 135-105) the Court allied itself with the conservative priestly aristocracy. With this reign the distinction between the two parties as such began, and the remainder of the Maccabean history is characterized by the struggle between the two parties.

Pompey's destruction of Jewish independence gave the final advantage to the Pharisees, but the Sadducees, through their wealth and position, still remained a strong element, although small and divorced from popular sympathy. It is a mistake to regard them as diametrically opposed to the Pharisees. The latter were the party of keen religious development; the Sadducees were those who hung back from religious advance through motives of conservatism, caste and culture. Hence in the theological differences between these parties, the Sadducees stood closer to the Old Testament, while their opponents went far beyond the theology of the Canon. The chief differences were these: The Sadducees did not believe in the resurrection of the flesh (cf. Matt. xxii. 23 sqq.), or in the existence of spirits and angels (cf. Acts xxiii. 8), in opposition to the huge development of Pharisaic angelology. Josephus also records that they denied Providence, while the Pharisees were predestinarian, and this is an indication of the comparative religious indifference of the party and perhaps also of Greek influence. The view that the Sadducees accepted only the Pentateuch is an error, although it is probable that they did not assign much authority to the later books as an integral part of the Canon. The chief sources of knowledge for these parties are the New Testament and Josephus; the former vividly represents the acute differences between the two (cf. Acts xxiii. 6 sqq.), but withal shows how the two could work together, as in the trial of Jesus and the persecution of the Christian Church (cf. Acts v. 17). The Sadducees have left no literary productions. The classic study of the subject is Wellhausen, *Pharisäer und Sadducäer* (Greifswald, 1874). Consult also: Schürer, *History of the Jewish People in the Time of Jesus Christ* (Eng. trans., Edinburgh, 1886-90); Derenbourg, *Histoire de la Palestine* (Paris, 1868); Edersheim, *Life and Times of Jesus* (London, 1896). See PHARISEES.

SADELER, sä'de-lēr. A Flemish family of engravers, the best-known of whom were the following: JAN the Elder (1550-c.1610), who was born at Brussels, worked at Mainz, Cologne, Frankfort, and Munich, and then settled in Venice, where he died. Of his work, numbering more than 200 plates, the portraits were the most meritorious part.—RAPHAEL (1561-1628), born at Brussels, was a pupil of Jan, and accompanied him to Germany and Venice; thence he returned to Munich in 1604, to execute the engravings for *Bavaria Sancta et Pia*, an extensive publication, completed in 1618. One of his principal works, which has become very rare, was "The Battle of Prague" (1620), in eight plates. —EGIDIUS (1570-1629), engraver and painter, nephew of the preceding, the most talented of the family, was born at Antwerp, accompanied his uncles on their travels, was called to Prague by Rudolph II. and continued there in high favor also under Rudolph's successors, Matthias and Ferdinand II. His plates after Italian, Dutch, and Flemish masters, his own compositions, and many excellent portraits number more than 400. A series of 52 plates on the Roman Antiquities, *Vestigi della antiquità in Roma* (1606), was always held in great esteem, and two very rare plates represent the "Interior of Vladislav Hall in the Burg at Prague" (1607). His painting of the "Martyrdom of Saint Sebastian" is in the Vienna Museum.

SÁ DE MIRANDA, sä dâ mê-rän'dä, FRANCISCO DE (c.1495-1558). A Portuguese poet, who wrote in Spanish also. He was born in Coimbra, studied law at Lisbon, traveled in Spain and Italy, and gave up all chance of advancement at Court or on the bench to devote himself to poetry. Save for a few of his pastorals, all his work bears the impress of the Italian school, and he is ranked first of the 'Petrarchists' in Spain and Portugal. Of his eight eclogues, six are in Spanish, and only two in Portuguese. As an innovator in the drama he was unsuccessful, his plays arousing no popular interest. His complete works, published first at Lisbon in 1595, were often reprinted; the best edition is that of 1885 at Halle, with biography by Karoline Michaelis-Vasconcellos.

SADI, sä'dê (Pers. *Sa' dī*) (c.1184-c.1291). One of the greatest of Persian poets, whose full name was Musharrif-ud-din ibn Muslih-ud-din Abdallah Sadi. He was born at Shiraz about 1184. The career of Sadi may be divided into three periods, of which the first extended from 1196 to 1226. These were years of study, which were spent in Bagdad, whither he had been sent by the Atabeg prince, Sad ibn Zengi, and it was then that he came under the influence of Suflism (q.v.). The dethronement of his patron by the Mongols in 1226 drove Sadi forth on a series of wanderings which lasted until 1256. This period of thirty years forms the second epoch in his life. In Delhi he learned Hindustani, in which he composed a few poems, and went thence to Yemen, after which he visited Abyssinia, returning before long to Arabia. After performing the pilgrimage to Mecca several times, he resided at Damascus and Baalbek, and finally dwelt as a hermit in the desert near Jerusalem. Here he was made captive by a scouting party of Crusaders, and was forced to menial drudgery, until he was recognized by a friend at Aleppo and ransomed. The poet married the daughter of his deliverer, but the union was an unhappy one, and Sadi resumed his wandering life. He traveled first through Northern Africa and then through Asia Minor, returning at last to his native city, where the Atabeg Abu Bekr ibn Sad, the son of his old patron, ruled. Here he spent the last and most important period, from 1256 until his death, about 1291. Within a year after his return to Shiraz he had composed his *Būstān* or Fruit-Garden (also called the *Sa'dīnāmah* or Book of Sadi), a didactic poem in ten cantos which deal respectively with ethics, justice, beneficence, love, humility, devotion, contentment, culture, gratitude, and repentance. The same general plan characterizes his more popular book, the *Gulistān* or Rose-Garden, which was written in the following year, and which still enjoys the utmost es-

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teem in Persia. It is divided into eight 'gates,' which symbolize the eight doorways of Paradise, and which treat of the customs of kings, of the morals of dervishes, of the preciousness of contentment, of the benefit of silence, of love and youth, of imbecility and old age, of the impressions of education, and of the duties of society. The lyric poetry of Sadi was voluminous. It comprised *Qaṣīdas* or eulogies, both in Arabic and in Persian, *Mathāvis* or elegies, highly artificial *Ghazals* or sonnets, the *Ṣāhibbīyah* or Book of the First Minister, forming a manual of statecraft, besides quatrains and distichs, and the *Muṭāyabat* or Jests (also called *Xabīθat* or Facetiæ), which are obscene in character and were written despite their author's protest at the command of his patron. The editions of the collected works of Sadi usually contain also six (or seven) prose works called *Risālas* or Missions, attributed to him, which are ethico-didactic in content. A *Pand-nāmah* or Book of Counsel, modeled on a poem of Farid-ud-Din 'Attar (q.v.), bearing the same name, is also often attributed to him, but is probably spurious. The *Kulliyat* or collected works of Sadi were edited by Harrington (Calcutta, 1791-95), and have been repeatedly published in the East both with and without commentaries. The *Būstān* was edited by Graf (Vienna, 1850), and translated into English by Clarke (London, 1879) and Davie (ib., 1882). The *Gulistan* was edited by Eastwick (Hertford, (1850), Johnson (ib., 1863), and Platts (London, 1874). It was the earliest of all Persian literature to be introduced into Europe, being translated into French by du Ryer in 1634. English translations have been made by Ross (London, 1823; reprinted, ib., 1890), Eastwick (Hertford, 1852; new ed., London, 1880), Platts (London, 1873), the Kama Shastra Society (Benares, 1888), and Arnold (London, 1899). Partial editions or translations of his lyric poetry have been made by Barb (Vienna, 1856), Gudemann (Breslau, 1858), Bacher (Strassburg, 1879), and Rückert (Berlin, 1893-94). Consult: Nève, *Le poëte Sadi* (Louvain, 1881); Ethé, "Neupersische Litteratur," in Geiger and Kuhn, *Grundriss der iranischen Philologie*, vol. ii. (Strassburg, 1896).

SADI-CARNOT, sä'dē' kär'nō'. See CARNOT.

SAD'LER, Sir RALPH (1507-87). An English diplomat. He was born at Hackney, near London, received a classical education, became early associated with Cromwell, Earl of Essex, and through his patronage was employed by Henry VIII. in the dissolution of the monasteries, and afterwards on diplomatic missions to Scotland. He was knighted for his gallantry in rallying the repulsed English cavalry at the battle of Pinkie in 1547, and was named in the King's will one of the 12 councilors to the commission of 16 nobles to whom the government was given. Elizabeth called him to the Privy Council; made him a jailer of Mary Queen of Scots at Tutbury Castle, and after her execution sent him in 1587, shortly before his death, on a mission of reconciliation to James VI. of Scotland. Consult *The State Papers and Letters of Sir Ralph Sadler, Knight Banneret*, edited by A. Clifford, with biographical memoir by Sir Walter Scott (2 vols., London, 1809).

SADLER'S WELLS THEATRE. A theatre in Clerkenwell, London, built in 1764 and reconstructed in 1876. The theatre is so called from a previous place of amusement on the site, opened in the latter part of the seventeenth century by one Sadler, after discovering an ancient mineral well, formerly renowned for its curative properties, but long choked up.

SADLIER, säd'lēr, MARY ANNE (MADDEN) (1820-1903). A Canadian author, born in Cootehill, County Cavan, Ireland. In Canada she married in 1846 James Sadlier. She translated several devotional works, especially De Ligny's *Life of the Blessed Virgin;* and wrote Irish historical novels, of which *The Confederate Chieftains* is the best known, and such novels of Irish immigrants in Canada as *Willy Burke* and *Eleanor Preston.*

SADO, sä'dō. A Japanese island (latitude 38° N., longitude 138° 45′ E.) off the western shore of the main island, Hondo, nearly opposite Niigata (Map: Japan, F 4). It is 335 square miles in extent. Two mountain ranges, from northeast to southwest, with a cultivated valley between them, constitute the island. The principal formation is limestone. Chalk, which is rare in the rest of Japan, is common here. The island was used as a place of banishment in the past. The capital is Aikawa, a poor town with a population of about 15,000. The chief harbor is Eleisu Minato, on the eastern coast. The island belongs administratively to the Prefecture of Niigata. Population, in 1898, 114,756.

SADOWA, sä'dō-vä, BATTLE OF. The name commonly given by French and English writers to the decisive battle of the Seven Weeks' War (q.v.), fought on July 3, 1866, and known to the Germans as the battle of Königgrätz. The Austrian army, with the Saxon contingent of 21,000 men, numbered about 200,000, under the command of Benedek, and occupied a strong position behind the Bistritz, some seven or eight miles northwest of Königgrätz. The Prussians numbered about 221,000 men, under the command of King William I. of Prussia, who directed the fighting from a hillock near the village of Sadowa. At 8 o'clock on the morning of July 3d the Prussians crossed the Bistritz and the First Army delivered an attack in front while the Second Army was sent to operate against the enemy's right. The Prussian centre met with stubborn resistance and after six hours' fighting had produced no effect on the Austrian lines. The movement on the left, however, had succeeded, and soon after 2 o'clock in the afternoon the Austrian right was in imminent danger. A concerted attack by the Prussian left and centre resulted in the capture of Chlum, the key of the Austrian position, and by 4 o'clock the battle had been decided, though desperate fighting continued until after nightfall. The Austrians and Saxons lost more than 1450 officers and 43,000 men in killed, wounded, and prisoners, while the Prussian loss amounted to 360 officers and 8800 men. Consult Jähns, *Die Schlacht bei Königgrätz* (Leipzig, 1876).

SADTLER, sät'lēr, SAMUEL PHILIP (1847—). An American chemist, born at Pine Grove, Pa., and educated at Pennsylvania College (class of 1867), at Lehigh University, at Lawrence Scientific School, and in the University of Göttingen. He was professor of natural science in Pennsylvania College from 1871 to 1874, professor of chemistry in the University of Pennsylvania, and

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in 1878 was appointed to a like chair in the Philadelphia College of Pharmacy. He was chemical editor of the American reprint of the *Encyclopædia Britannica*, became chemical editor of the *United States Dispensatory* in 1880, and wrote a *Hand-Book of Chemical Experimentation* (1877); *Industrial Organic Chemistry* (1891); and *Pharmaceutical Chemistry* (with Coblentz, 1895).

ŠAFAŘÍK, shäf'ar-shĭk, PAVEL JOSEF (1795-1861). A Slavic philologist, born at Kobeljarowo, Hungary, and educated at Kesmark and Jena. After acting for two years as a private tutor at Pressburg, he became in 1819 director of the Servian gymnasium at Neusatz. He resigned this post in 1833 and removed to Prague, where he spent the remainder of his life. From 1837 till 1847 he was a censor, and in 1841 became connected with the library of Prague, of which he was appointed librarian seven years later, having declined calls to Moscow and to both Breslau and Berlin. He accepted, however, in 1848, the appointment to the chair of Slavic philology, founded at his own suggestion in the University of Prague, but resigned it in the following year. In 1857 he became insane. Šafařík was a prolific author. His principal work was the *Slovanské Starožitnosti* (*Slavic Antiquities*) (1837; 2d ed. 1863; trans. into German 1842-44). Important also were his collection of Slovak folksong, prepared in collaboration with Kollar and others (1823-27); *Slovanský Národopis* (*Slavic Ethnology*) (1842; 3d ed. 1849), containing a chart of the Slavic dialects; *Počátkové staročeské mluvnice* (*Elements of Old Czech Grammar*) (1845); *Geschichte der slawischen Sprache und Litteratur* (1826; 2d ed. 1869); *Die ältesten Denkmäler der böhmischen Sprache* (in collaboration with Palacký, 1840); *Glagolitische Fragmente* (in collaboration with Höfler, 1857); *Geschichte der südslawischen Litteratur* (3 vols., ed. by Jireček, 1864-65).

SAFED, sä'fĕd'. A city in Palestine, situated on a mountain 2500 feet high, 13 miles north by west of Tiberias (Map: Palestine, C 2). It has ruins of a huge oval castle built by the Crusaders in the twelfth century. There is a college for instruction in Hebrew and the Talmud. The industries are dyeing and the manufacture of cloth. The surrounding country grows grapes and olives abundantly. Before 1837 Safed was a handsome town. In that year it was partly destroyed by an earthquake and more than 4000 persons were killed. Population, about 25,000, the bulk of whom are Jews, who believe that the Messiah will make Safed his capital.

SAFES AND SAFE DEPOSIT VAULTS. A safe is a portable structure in which to store valuables, constructed so as to be secure against fire, thieves, and burglars. A safe deposit vault is built and used for the same purposes as a safe, but is stationary, being part of the building in which it is situated. A safe is made fire-proof by building inner and outer walls of sheet iron or steel and filling the space between with plaster-of-Paris, alum, clay, or concrete, which are non-conductors of heat and contain a large proportion of water. When such a safe is exposed to heat at 212° F., under ordinary pressure the alum gives off its water of crystallization which becomes steam. The contents of the safe will be uninjured so long as the steam is maintained; but, in a protracted fire, there is danger of the water and steam being entirely expelled. In some cases vessels of glass or metal are placed in the packing, but the chemicals which are ordinarily dry are preferable, for dampness rusts the walls of the safe. A safe is made burglar-proof by building up its walls of layers of alternately hard and soft iron, steel, or franklinite plates of different thickness ('laminated' structure) or of solid metal plates. Such safes are not always fire-proof themselves, but are placed in fire-proof buildings or surrounded by masonry. Some are made fire-proof by fillings of concrete between their walls, which are made of welded iron and steel, carbonized and decarbonized steel and crystal steel fastened together by bolts on the inside.

Safes were originally made of thick oak plank, saturated with strong alkali and covered with thick sheet iron, into which huge knob nails were driven. They were secured by a common warded lock, a hasp without any lock, or iron bands with hasps, staples, and padlocks. These so-called safes were hidden for safe-keeping. A banker's chest was made later with wall three and one-fourth inches thick. It consisted of three castings of one-fourth-inch wrought iron, with angle corners; a casting of one-fourth-inch steel bars; a casting of one-fourth-inch wrought bars, with angle of solid corners, and a casting of patent crystallized iron, two inches thick, with wrought iron rods cast through it and projecting rivets on each side. Such a structure is intended to obstruct drilling. The large bolts which pass through the layers are conical in form. The smaller countersunk screws, as well as the lock spindle, are made of welded and twisted iron and steel. The lock spindle is made of sections of alternate hard and soft iron or steel. The change from hard to soft, or *vice versa*, is almost certain to break the burglar's drill, and thus prolong the time required for penetration. The compound hinges sometimes used allow the door to be moved parallel to itself before being opened, making an air-tight packing between its jambs and their abutments. Safes usually have both inner and outer doors, each with special combination lock mechanism and even a time-lock. All the parts are close fitting to prevent the use of liquid explosives. The doors, if laminated, are commonly made with a set of dovetails, engaging with corresponding parts of the jamb. Some doors are made circular; some, screw shaped.

The safe deposit vault differs from the safe in several essential particulars, — in size, construction, and methods or operation. Primarily, it serves the same purpose—the safe-keeping of valuables — but instead of being owned and operated, as a safe is, by a private individual or a business house, it is owned by a company which operates it for the benefit of the public by renting out the boxes and safes contained in it. A safe deposit company, obtaining its right to existence by charter from the State, renders semi-annual report of its condition to the Superintendent of the Banking Department or other duly qualified officer. Once a year or oftener, a representative of this department makes an official examination as to the conduct of its officers, directors, and trustees, the safety and prudence of management, the security afforded depositors and whether the provisions of the charter and of law have been complied with.

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The powers of a safe deposit company, as defined in its Certificate of Incorporation under the laws of the State of New York, consist of "receiving upon deposit, as bailee, for safe-keeping and storage, personal property of value, guaranteeing its safety, and renting safes and vaults for such purpose." In regard to the guarantee, it is found, in practice, that, while the contents of a trunk, chest, or package, deposited in the room or compartment intended for the storage of silverware, are usually insured by the company (for the value named by the owner) against loss by burglary, theft, or fire, there seems to be no such guarantee or insurance on property placed in the safe deposit vault. For the company to admit the possibility of insecurity or vulnerability of any kind in this inner fortress would be, not merely a very bad business policy, but a direct contradiction of terms. The advertising circulars of all these companies are emphatic in their assurance that their vaults are fire-proof, burglar-proof, bomb-proof, and mob-proof! These vaults are practically impregnable fortresses of stone and steel, protected by every contrivance for safe-keeping that modern ingenuity can devise. Insurance policies are therefore superfluous. As bailees for hire safe deposit companies are legally bound to exercise at least ordinary care in keeping property entrusted to them. The burden is upon them of explaining its non-appearance, when such property has been properly deposited. Even where the contract provides that the company shall use diligence that no unauthorized person shall be admitted to any rented safe, and beyond this shall not be responsible for the contents of the safe, the court held in a California case that such contract relates to the degree of care required of the company in the identification of parties claiming to be its customers, and does not relieve it of its duty, as a bailee for hire, to guard the property placed in its charge. In case of an attachment by a depositor's creditor under a writ of execution in the hands of the sheriff, the rule of law is equally clear in regard to the company's duty; even here the closest care must be exercised and the strictest inquiry made by the company as to the sheriff's authority, the contents of the writ and the depositor's title to the property.

The construction and guarding of safe deposit vaults has kept pace with and surpassed the burglar's ways and means of breaking in. This is, of course, considering the vault as under "burglarious conditions." No safe or vault is either fire-proof or burglar-proof if these forms of destruction are allowed unlimited time. Burglary, by definition, is a forcible entry at night. It would be impossible for a safe-breaker, working from Saturday night to Monday morning, counting upon no interruption, which is the longest period he might work without being disturbed, to get inside the steel doors of the safe. To use the amount of nitroglycerine to send the door from its hinges would totally wreck almost any building. The aim of every manufacturer, however, is to make a safe or vault which will withstand any unlawful attack upon it by burglars or mobs and yet leave possible the opening of the safe in case of accident.

The attacks of the burglar may be upon the body of the safe, upon the door or upon the locking mechanism. The methods employed are by tunnelling, drilling, hammering and the use of explosives. The tools used are jimmy, drill-press and drills, wedges, chisels, hammer and sledge, flask of gunpowder and fuse, and an air pump to introduce explosives at the joints around the door, the modern methods of these *chevaliers d'industrie* being to apply, where possible, either nitroglycerine or dynamite. The simplest outfit consists of a piece of putty, a bar of soap, a small steel wedge, and a phial of nitroglycerine. The most acceptable construction for the body of the safe or vault, to resist such attacks, has been, until quite recently, that of 'laminated' plates, the walls being built up of layers of steel riveted through adjacent plates, as in the construction of safes. The plates are of different thicknesses, and usually alternately hard and soft, the outer plate being heavier than the others and very hard. They are known as five-ply wedded plates. The latest improvements in the manufacture of steel have been utilized in providing material for vault construction, both chrome steel and manganese steel having been employed for the solid plates, the latter material with special success. A vault built of solid manganese steel or armor-plates, five to twelve inches thick, is the latest construction now in use, it being set up with no surrounding masonry excepting that of its foundation. The alloy known as manganese steel was discovered by Robert Hadfield, of Sheffield, England, in 1883. It is sufficiently hard to resist drills, thermit, or blow-pipe, and is sufficiently tough not to be fractured by sledge or explosives.

The manganese vault furnishes "the best answer that the banks and trust companies can make to the tools and explosives of the professional cracksman." Its walls are thick and its corners of solid arches, flat-surfaced, are keyed on the inside. The method of making Harveyized armor-plate for vault construction is described as follows by one of its manufacturers: The plate is cast and forged to necessary thickness; then covered with a carbonaceous material and heated for several weeks in a furnace until the carbon, which is the hardening element in steel, has eaten down several inches into the body of the plate. The plate is then reduced in size, and the edges, where they lock into each other, are machined and ground down by the use of emery or corundum wheels revolved at high speed, to dovetail shapes representing the system of joining at the corners or angles. The plates are heated and then hardened by subjecting them to a bath of cold water, which is sprayed upon the plates with great force from large mains, twelve inches in diameter. The vaults are built with the hardened surface on the outside. The dovetails are formed with one face square and the opposite face cut at the designed angle. The clearances are so arranged that the dovetails slide snugly into place as the plates are drawn together, and after they have been brought home, long wedging strips and key pieces are driven into place from the inside of the vault, locking the plates securely in position. It is impossible to use drills, wedges, or explosives on this construction; nor can the temper be taken out of the steel by using an arc light, the conditions necessary for using the arc being too difficult for the burglar to obtain and operate without detection.

The door may be attacked by drilling, or by the introduction of wedges or liquid explosives. The hard, solid plates of solid manganese steel resists drilling here as on the body of the vault.

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Wedges are resisted by the series of offset bearings and by bolts which shoot in all directions and hold the door in place independent of its hinges. The introduction of liquid explosives is prevented by the close fit of the door when closed, it being hung on a crane-like hinge and forced to its seat by a powerful lever. Some doors have tongue and grove joints, with elastic packing fitted in the grooves; others are circular instead of rectangular, being more easily ground to their bearings by a rotary motion in the process of making after hardening, and thus they close as tightly as any steam valve. In addition to this, the size and weight of many a vault door of modern construction is enough to challenge successfully any attempt at breaking in. One of these recently hung in a downtown New York vault weighs thirty tons. The small emergency door provided for ventilation and to guard against the possibility of lock-out through the failure of any of the delicate and intricate time-lock mechanism to operate, is a small replica of the large entrance door.

The locking mechanism would seem to be the most vulnerable point of attack. It consists of a handle attached to a spindle which passes through the door and throws the bolts, which are then locked into position by a separate mechanism controlled by one or more combination dial locks. To prevent the possible weakness of a perforated door the spindles are very closely fitted and packed. In some cases an automatic bolt work is employed, the bolts being thrown by springs upon the closing of the door, and retracted by another set of springs after the lapse of a predetermined period of time controlled by a time-lock.

The time-lock, now universally used, is one of the most ingenious devices known to modern invention. Before its introduction it was possible for the burglar to awaken the vault's custodian at his home at night, and at the point of the pistol compel a disclosure of the 'combination' to the vault. Now, not even the custodian can open the vault door until the expiration of the time which was indicated on the dial of the clock inside the door before the vault was closed and locked for the night. On the chance that one of these clocks may stop or break down before the expiration of the time indicated, four of them are used, each more costly than a superfine gold watch, and any one will release the locking mechanism.

But all this massive and intricate construction would be ineffectual and its strength unavailing without the eternal vigilance necessary to insure the complete security of the property stored within the vault, property which in any one of a half dozen New York City vaults is worth many millions of dollars. Special precautions are thrown about the vault inside and out, by night and by day. At night, armed watchmen make rounds and indicate their presence every half hour by punching the paper dial of a time-detector, which, the next morning, fully perforated, is placed in the hands of the deposit company's president. Each punch is indicated also by electric connection with the headquarters of the Detector Company in another part of the town. It is the watchman's "All's well!" Should a punch be omitted, agents of that company would immediately investigate the cause of the watchman's failure to perform his duty, ready to rescue him from possible mishap and defend the property against assault. Electric attachments in some cases connect the bolting apparatus with police headquarters. A vault of recent construction is so completely wired by hidden connections, that any interference with any part of it gives an alarm to the Electric Company's central office.

It is in the daytime, however, that the utmost care must be observed by the vault's custodians. They have to guard themselves then, not against burglars, but against sneak thieves, the "light-fingered gentry." The vault door is open. Customers pass in and out, and, during the busy hours of the day, are there in considerable numbers. It is a matter of some surprise that customers once within the grille (the high iron fence that surrounds the vault enclosure) should freely enter the vault, unlock their safes (after the custodian has applied the master-key which turns the lock part way), and then, unguarded, remove their tin boxes which contain their valuable papers or family jewels, and pass and repass out of the vault into the coupon rooms adjoining, and so return. This unguarded freedom of action has been referred to as "a measure of the pecuniary confidence which members of a community repose in one another," as one of the signs of the times, and as an index of our advanced civilization. But it must not be overlooked that no person is admitted as a box-holder in a safe deposit vault who has not been properly introduced, and able to give reliable references which have been promptly investigated; and each one so admitted, for identification afterwards, is required to leave his personal description and signature, and is given a secret pass-word which may at any time be demanded of him by the guard at the grille door.

Many customers or 'box-holders' find it necessary to appoint deputies to visit the vault for them. The appointment is made only by power of attorney, signed, sealed, and witnessed; and the same means of identification are required of the deputies as of their principal. With all these precautions against theft, for the protection of the property of the box-holders, one would suppose that there were sufficient safeguards for all practical purposes; but beyond all this another safeguard has been found necessary where least expected, and that is to circumvent the carelessness of the box-holders themselves. There is a stack of rifles ready against the man who is caught suspiciously 'hob-nobbing' at the combination locks inside the vault or 'monkeying' with the hinges of the safe doors; but what shall be done with the box-holder who thoughtlessly puts his tin box in another man's safe, the door of which he finds open next his own, locks the door with the key already in the lock, puts the key in his pocket and goes home? The danger of this accident lies in the fact that the other man, like every safe-holder, is provided with a duplicate key. Sometimes this error is committed by the attendant in the employ of the deposit company. What is to be done with the man who keeps one of the two keys of his safe deposit box on his key-ring and puts the other in the box instead of keeping it at home and, losing the key from his key-ring, is unable to open his box? Sometimes a box-holder makes the mistake of supposing that the manager of the vault has access to each box, as when, forgetting his key, he asks the manager to open his box for him. What is to be done with the woman who, in changing her box for one of

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larger size, leaves a nest of diamond and sapphire buttons carefully wrapped in tissue paper and tucked away under the lid of the box she has relinquished? Or, how is the man or woman to be treated who leaves on the floor of the coupon room a few coupons of good stock, an endorsed check, or a roll of hundred dollar bills? Yet, these are cases from actual experience. There should be upon every tin box in a safe deposit vault the number of the safe to which it belongs, and each box-holder should be advised to lock his safe door after removing his box and before taking it into the coupon room. Every box relinquished by a box-holder should be thoroughly searched by the vault's custodian to satisfy himself that it is empty before he rents it to another customer; and when a box-holder has used a coupon room, the table, floor, and waste-basket should be examined by an attendant before the box-holder leaves the building and another enters the room.

When the day's business is over, two officers of the safe deposit company see that the clocks of the time-locks are properly set and running (they are usually wound in the morning, after opening for business, in order to detect any stoppage or other irregularity of action during the day), and the two men together close and bolt each ponderous door of the vault, and verify each other's work by testing the bolts after "throwing off" the dials of the combination locks.

The safe deposit company not infrequently co-operates with a trust company. By this arrangement, out-of-town financial institutions, non-residents, or those leaving the city temporarily, may place their securities in vaults to which access can be had only by the joint action of an officer of the trust company and the owner, or, in the absence of the owner, by the trust company's officer and an officer of the safe deposit company. Thus, the deposit, substitution, withdrawal or sale of securities and the collection of coupons or maturing obligations, may be doubly safeguarded. The trust company credits all moneys collected and allows interest thereon; it acts as trustee, guardian, administrator, or agent. The arrangement affords those availing themselves of it the privilege of consulting officers well trained in financial matters in reference to their business, and who are competent to act in any emergency in their absence.

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SAFETY APPLIANCES. Methods and mechanisms used to insure workmen against bodily harm. With the multiplication of factories and the increasing use of machinery, the necessity of safeguarding the conditions under which labor is performed has become a vital one to the public as well as to the workmen. The result of long-continued labor in industries not properly safeguarded manifests itself upon the physique of the workmen. Their height is usually below the average, their bodies are weak and anæmic. Eventually the average length of life is shortened. Rohé gives the following statement showing the average length of life in Massachusetts:

	Years
Factory workers	36.3
Craftsmen	50.8
Workingmen without any definite vocation	47.4
Farmers	65.3

Among the most important safety appliances are those designed to protect workmen from vitiated air. Ordinary deterioration resulting from exhalation, or from illumination, can be avoided by ventilation. Special appliances are necessary to guard against dust and gases. Of many arrangements for the removal of noxious gases, fans and hoods are among the most effective. In many smelting rooms sheet-metal hoods are used, which can be moved vertically and are connected with the chimney by pipes. When material is melted hoods are let down to cover the smelting kettles. Mechanical stirrers are used to obviate the necessity of workmen standing over the kettles. Dust in its several forms—metallic, mineral, vegetable, animal, and mixed—is removed by exhausters, or laid by water-sprayers. In especially dangerous industries workmen are provided with respirators—usually in the form of a sponge or cloth worn over the mouth. Workmen can be protected from injuries resulting from the character of materials handled. Impermeable gloves and shoes can be provided against hot liquid. Dangerous machinery can be fenced. Consult Doehring, "Factory Sanitation and Labor Protection," *Bulletin of Department of Labor, No. 44*.

SAFETY-LAMP. A lamp used by miners, the flame of which is protected by wire gauze, so that the ignition of inflammable gases is prevented. In the Davy lamp, invented by Sir Humphry Davy in 1815, the cylinder is covered with a close metallic gauze, and is protected by three external, strong, upright wires, which meet in a plate or cap at the top to which a ring is attached for suspending the lamp. The oil is supplied to the interior by a pipe projecting from the cylinder, and the wick is trimmed by a wire bent at the upper end, and passed through the bottom of the lamp, so that the gauze need not be removed for this process. When a lighted lamp of this kind is introduced into an explosive mixture of air and fire-damp, the flame is seen gradually to enlarge as the proportion of light carbureted hydrogen increases, until at last it fills the entire gauze cylinder. Whenever this pale, enlarged flame is seen the miners should depart to a place of safety, for, although no explosion can occur while the gauze is sound, yet at a high temperature the metal becomes rapidly oxidized, and might easily break; and a single aperture of sufficient size would then occasion a destructive explosion. Sir Humphry Davy's claim as an original discoverer was immediately challenged by various persons, among whom may be especially noticed Dr. Reid Clanny, of Newcastle, and the great engineer George Stephenson. Clanny's safety-lamp was based on the principle of forcing air through water by bellows; but the machine was ponderous and complicated, and required a boy to work it. In later forms of the Clanny lamp the bellows was omitted and a glass cylinder was used to surround

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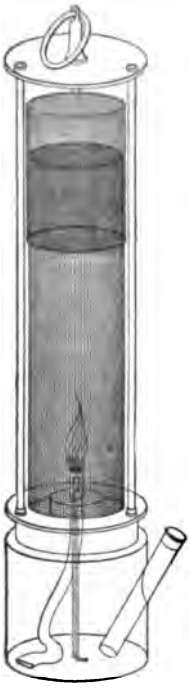
the flame, while there was a wire gauze cylinder above. Stephenson's, familiarly called the *Geordy* lamp, was actually in use at the Killingworth mines. In its general principle it was the same as Davy's, the main difference being that the Stephenson lamp had a glass cylinder besides the gauze one, to resist strong currents of air, and that glass without gauze is not safe from fracture. In the Gray lamp, which is considered one of the best safety-lamps, the air enters at the top and passes down through four tubes and then a strip of gauze before reaching the flame. The products of combustion pass up a cylindrical chimney, which is of smaller diameter half way to the top in order to avoid down currents and to keep the air near the burner as vitiated as possible and thus retard combustion. In the French and Belgian collieries Mueseler's lamp is in almost universal use, and it is also employed in England and America. It consists of a glass cylinder immediately around the flame, and of wire gauze above. An internal metal chimney opening a short distance above the flame creates a strong upward draught, which causes the freed air to pass briskly down from the wire gauze, and so keeps the glass cool and insures thorough combustion.



DAVY SAFETY-LAMP.

In connection with improvements in the safety-lamp various devices increase its safety and efficiency as a detector of the presence of fire-damp. By mechanical arrangements the danger of the safety-lamp being converted into an open-flame lamp by any chance or mishap is obviated. In nearly every instance there is some device for locking the gauze about the flame after the lamp has been lighted. This is done to prevent by any possibility the naked flame from coming in direct contact with the exterior atmosphere, and the locking device is operated either by a key, a powerful magnet, or compressed air. The presence of fire-damp is shown by an elongation of the flame of the lamp and the formation of a luminous cap or blue flame, which increases in size with the amount of gas present in the atmosphere. The miner tests for the gas by turning his flame down to a point where it is practically non-luminous and then noting the size of the cap. As detectors of fire-damp the various lamps have been ranked as follows: Gray, Mueseler, Marsaut, Morgan, Davy, and Stephenson. For this special purpose lamps have been devised which burn alcohol or some other substance and give a sensitive flame. Of these the Pieler lamp, which burns alcohol, is one of the simplest arrangement, which has been modified by Chesneau in a lamp burning methyl alcohol containing cuprous chloride, which indicates the gas not only by the cap but by the changed color of the flame. The Claves lamp contains, besides a luminous flame of oil, a supply of compressed hydrogen, which is burnt at a small jet and is used for testing where the air contains less than three per cent. of the gas.

The use of electricity has become very general in mines, both for lighting and power, and it is obvious that the incandescent lamp, as it burns *in vacuo*, and is perfectly safe in an atmosphere of any gas, however explosive, furnishes the best possible means of illumination. The only objection raised against the incandescent lamp for mines is that with proper insulation, suitable wiring, and the rough usage it receives, the expense of the light is very large in comparison to the wire-gauze lamp. Portable electric lamps for miners are also used, but their use has never been widespread, owing to the difficulty of carrying a battery large enough to supply the light for a reasonable time, the tendency to get out of order with rough usage, and the high cost of the apparatus. Consult Graves and Thorp, *Chemical Technology*, vol. ii. (Philadelphia, 1895).

SAFETY-VALVE. A circular valve placed on an opening in the top of a steam boiler, and kept in its place either by weights above it, by a lever of the second order, with a weight capable of sliding along the arm, or by a spring. In stationary engines one valve is frequently found sufficient, and the pressure on the valve is produced in the first or second of the methods indicated above. In locomotive engines (see LOCOMOTIVE), on the contrary, there are always two valves. Whenever the tension of the steam in the boiler rises above a certain amount (the weight in pounds with which the valve is held down divided by the area in inches of the under-surface as exposed to the steam), the valve is forced upward and, the pressure on the boiler thus relieved, the valve sinks to its place. The only precaution necessary is to be sure that the valves are not too heavily loaded or fastened. The grate surface is now the commonly accepted unit by which to determine the size of the safety-valve. The United States regulations for steam vessels require that lever safety-valves shall have an area of not less than one square inch to two square feet of grate surface in the boiler, and this proportion also obtains in good stationary engine practice.

SAFFI, säf'fē. A seaport of Morocco. See SAFI.

SAFFLOWER (OF. *saflor, safleur*, from OIt. *saffiore, asfiore*, from Ar. *uṣfūr*, saffower, from *safrā'*, yellow, influenced by popular etymology with Eng. *flower*), *Carthamus tinctorius*. A branching annual plant of the natural order Compositæ, two or four feet high, with dark orange or vermilion flowers. It is a native of India, whence it probably spread to Egypt and the Levant, where it became naturalized. It is extensively cultivated in Southern Europe, especially France, and in some parts of South America, for its corollas, which are picked by hand in dry weather, dried in a kiln, and formed into small, round cakes used as yellow and red dyes. The safflower of Persia is generally esteemed the best. Safflower is sometimes called bastard saffron, and is used to adulterate saffron. The yellow coloring matter is valueless as a dyestuff, and since the red (carthamic acid or carthamine)

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fades with light and age, it is not as popular as formerly. Rouge derives its color from safflower.

SAFFORD, James Merrill (1822—). An American geologist, born at Zanesville, Ohio, and educated at the Ohio University and at Yale. He was professor of natural sciences at Cumberland University, Lebanon, Tenn.; of chemistry in the medical department of the University of Nashville, and in 1875 was made professor of mineralogy, botany, and economic geology at Vanderbilt University. His publications include A *Geological Reconnoissance of the State of Tennessee* (1856), and the *Geology of Tennessee*, with a map of the State (1869).

SAFFORD, Truman Henry (1836-1901). An American astronomer, born in Vermont, and educated at Harvard. In 1863 he was made assistant observer at the Cambridge Observatory, and in 1865 became director of that at Chicago. He was professor of astronomy at Williams College (1876-99) and built a meridian observatory there. He published a star catalogue and a catalogue of right ascensions of close polar stars. Safford also predicted the position of the companion of Sirius (q.v.).

SAFFRON (*Crocus sativus*).

SAFFRON (OF. *safran, saffran*, Fr. *safran*, It. *zafferans*, Sp. *azafran*, from Ar. *aṣfarān*, saffron, from *ṣafrā'*, yellow). A bright yellow flavoring and coloring material, consisting of the dried stigmas of the common yellow crocus (*Crocus sativus*), the bulbs of which were introduced into Europe from Asia Minor. They are largely cultivated in Spain. Saffron is often employed as a perfume, but its chief uses in America are for flavoring and coloring confectionery and culinary articles. Its great solubility in water prevents its use as a dye for fabrics. See Crocus.

SAFFRON WOOD. A South African timber tree. See Elæodendron.

SAFI, sä'fê, or **SAFFI** (Arab. *Asfi*, or *Asaffi*). A seaport on the northwest coast of Morocco, 102 miles west-northwest of the city of that name (Map: Africa, D 1). It was at one time the chief seat of the trade with Europe, and, though it has declined with the rise of Mogador, it still has considerable export trade, chiefly in leather, horses, and grain. Population about 9,000.

SAFTLEVEN, säft'lä'fen, **SAFTLEBEN,** or **ZACHTLEVEN,** Cornelis (1606-81). A Dutch painter and etcher, born in Rotterdam. Influenced by Brouwer and Teniers, he painted guard rooms, rural interiors, and landscapes with figures and cattle, characteristic specimens of which may be seen especially in the Dresden Gallery, while others are in the Louvre, in Amsterdam, Cologne, Karlsruhe, Brunswick, Vienna, and Saint Petersburg. His etchings are held in great esteem.—Herman (1609-85), a brother and probably pupil of the preceding, was a landscape painter and etcher, who formed himself chiefly by studying nature. In 1633 he went from Rotterdam to Utrecht, where, in 1655, he became head of the painters' guild. His views on the Rhine, Meuse, and Moselle, enlivened with figures and animals, are distinguished by their clear perspective and a soft bluish coloring. The Dresden Gallery possesses seventeen of his pictures on a small scale, executed with minute delicacy, while others may be seen in most of the principal galleries of Europe. His etchings, about 38 in number (1640-69), include a portrait of himself and rank among the best of their kind.

SAGA, sä'gà. The capital of the prefecture of the same name in Japan, situated in the northwestern part of the island of Kiushiu, 82 miles by rail northeast of Nagasaki (Map: Japan, B 7). It was formerly the residence of the lords of Hizen, whose beautiful park is a feature of the town. Population, in 1898, 32,753.

SAGA (Icel., tale, story, history). The name applied to the most important division of Icelandic prose literature. This form of literary production was developed in Iceland alone, and this was due possibly to the fact that the families that settled there were men in whom the talent for story-telling was inherent, while the long period of gloom and semi-night that shrouds this remote island the greater part of the year evoked this form of instructive amusement, whereby the deeds of their ancestors and even their friends were related in attractive form. Possibly their intercourse with the Irish, who even before the eleventh century had a prose literature, may have abetted this tendency.

At the annual gathering at the Thing in Iceland in midsummer old sagas were told and material for new ones was often gathered. At first the sagas were merely told by Sagnamenn and kept alive in the hearts and minds of each succeeding generation until they were written down, some in the twelfth century, but the majority in the thirteenth. The written saga has used the oral saga only as a background, inasmuch as it has borrowed certain definite data and genealogies, but the author of the written saga has been original in language, in characterization, and in dramatic arrangement. The saga has its fixed laws and set phrases, and, although there is a vast difference in style among the sagas, certain restrictions are as clearly adhered to as in verse. The saga rises at times to an almost epic grandeur and some of them have much poetry interspersed through them. The simplest form of saga was the þáttr and the frásogn or frásaga, the former of which was mainly some stirring deed or episode out of the life of a great Icelander, and the latter a simple narrative.

The sagas are divided into several groups: (1) Historical sagas; (2) mythical or heroic sagas; (3) romantic sagas. Historical sagas are subdivided into *Íslendingasögur* and *Konungasögur*. The *Íslendingasögur* had as their theme the life of some noted Icelander. They frequently began with his ancestry, traced it down through him

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and sometimes his descendants, recounted his life, his struggles, his travels, his loves, and his hates, and frequently, after his death, the vengeance that was wreaked upon his enemies by his kinsmen. They are stirring accounts, vivid and forceful, and by the introduction of dialogue, have intense dramatic vigor. The events recorded occur mostly between the years 874-1030, and they convey to us a fair and faithful picture of life in Iceland during those centuries. Several sagas are sometimes grouped together as the *Egilssaga* and *Gunnlaugssaga*, the *Hrafnkelssaga* and *Droplaugarsonasaga*. Some show evidence of several sagas combined, as in the *Njálssaga*, which comprise both the *Gunnarssaga* and the *Njálssaga*.

The *Konungasögur* contain the lives of the kings, mainly of Norway; the most important is the *Heimskringla*, by Snorri Sturluson (q.v.) (ed. by Unger, Christiania, 1868). It contains among other well-known sagas the *Olafs saga Trygg vasonar*. Historical sagas rarely contain any personal views of the author and they attained under Snorri, about 1230, their greatest height. Some of the sagas of the classical period are literary and æsthetic works of art.

The mythical or heroic sagas are quite different in form and speech from the historical. Some legend or hero is the central figure of the saga, and fact and fancy are mingled freely together. The most striking example of this type is the *Volsungasaga* (q.v.) (ed. by Bugge, Christiania, 1865), which is a prose rendition of the Nibelungen story as it is given in the Eddic lays. See EDDA.

The romantic sagas are mainly adaptations or imitations of Latin, French, or German themes, and were not reduced to writing before the middle of the thirteenth century. There were sagas dealing with Alexander, Charlemagne, Parcival, Tristan, etc.

The *Íslendingasögur* may be divided according to the different geographical districts of Iceland. As a rule the best sagas come from the West. Here are found, among others, the *Egilssaga* (ed. Copenhagen, 1809, 1856, 1888; trans. by Green, London, 1893); the *Eyrbyggjasaga* (ed. by Vigfusson, Leipzig, 1864; trans. by Morris and Magnússon in *The Saga Library*, vol. ii., London, 1892); and the *Laxdælasaga* (ed. by Kaalund, Copenhagen, 1890-92; trans. by Press, London, 1899). The last-named is a saga of romance and is the foundation for William Morris's "Lovers of Gudrun." The *Gunnlaugssaga*, a continuation of the *Egilssaga*, is the most beautiful yet tragic Icelandic love story (ed. by Von Rygh, Christiania, 1862, tr. by Morris and Magnússon, London, 1869). To the North belong the following: *Kormákssaga* (ed. Möbius, Halle, 1886), *Reykdælasaga* (ed. by Ásmundarson, Reykjavik, 1898), *Svarfdælasaga* (edited by the same scholar, ib., 1893), *Viga Glumssaga* (edited by the same scholar, ib., 1898, tr. by Sir Edmund Head, London, 1866), *Grettissaga* (ed. by Magnússon and Thordarson, Copenhagen, 1852-59, by Ásmundarson, Reykjavik, 1900, tr. by Magnússon and Morris, London, 1869). This is the story of the most famous of Icelandic outlaws.

To the East belong the *Vápnfirþingasaga*, the best saga from this district (ed. by Asmundarson, Reykjavik, 1898). We have also the *þorsteinssaga hvíta* (ed. with previous saga by Thordarson, Copenhagen, 1848), the *Hrafnkelssaga*, a purely idyllic saga (ed. by Ásmundarson, Reykjavik, 1893), and the *Droplaugarsonasaga* (ed. by Jónsson, Reykjavik, 1878).

In the South is found the *Njálssaga* (ed. by Ásmundarson, Reykjavik, 1894, tr. by Dasent, Edinburgh, 1861). This is the foremost of all sagas, full of intrigue and cunning, of hate and love, with remarkable characterization.

Sagas relating to Greenland and America are the *Eirikssaga rauda*, *Fostbræþrasaga*, *Græhlendiga þáttr* in the *Flatey-bók* (all ed. by Rafn in *Antiquitates Americanæ*, Copenhagen, 1837), and by Reeves, *The Finding of Wineland the Good* (London, 1890).

The *Sturlungasaga* occupies a position different from the sagas mentioned above because we can here trace authorship to Sturla Thordsson (1214-84) (ed. with elaborate introduction by Vigfusson, Oxford, 1878).

Historical sagas referring to other countries are the *Knýþingasaga*, giving a history of the Danish kings, and the *Orkneyingasaga* or *Jarlasaga*, giving a history of the earls of Orkney.

The *Flatey-bók* (ed. by Unger and Vigfusson, Christiania, 1859-68) contains many þættir. The most notable are *Ogmund dytt* and *Thorstein Oxfot*.

In addition we have the *Skröksögur* or spurious sagas which show the rapid decline of the saga in the fourteenth century.

Consult: Muller, *Sagabibliothek* (3 vols., Copenhagen, 1817-28, German tr. by Lange, Frankfort, 1832); Weinhold, *Altnordisches Leben* (Berlin, 1856); Möbius, *Ueber die älteren isländischen Sagas* (Leipzig, 1852); Döring, *Ueber Typus und Stil der isländischen Sagas* (ib., 1877); Vigfusson, *Prolegomina* in his edition of the *Storlunga Saga* (Oxford, 1878); Heinzel, *Beschreibung der isländischen Sagas* (Vienna, 1880); Morris and Magnússon, *The Saga Library* (London, 1884 et seq.); Mogk, "Norwegisch-isländische Literatur," in Paul, *Grundriss der germanischen Philologie* (vol. ii., 2d ed., Strassburg, 1902).

SAGAING, sä'gà-ēng'. A Division of Upper Burma, British India, comprising the districts of Upper and Lower Chindwin, Sagaing, and Shweb. Area, 30,038 square miles. Population, in 1891, 821,769; in 1901, 999,168.

SAGAN, zä'gàn. The capital of the mediatized Principality of Sagan, in the Province of Silesia, Prussia, on the Bober, 82 miles northwest of Breslau (Map: Prussia, F 3). It has a castle with a beautiful park, a gymnasium, and a normal school. Its manufactures include cotton and woolen cloths, pottery, porcelain, glass, and paper. Population, in 1900, 13,367.

SAGAR, sä-gēr'. An island of Bengal, India. See SAUGOR.

SAGAR, SAUGUR, or **SAUGOR.** The capital of a district of the same name in the Central Provinces, India, 47 miles southeast of Bina by rail, on the Sagar Lake (Map: India, C 4). It is regularly laid out, and has broad streets. The most striking feature is the fort on an elevated site overlooking the town; it covers an area of 6 acres, and is surmounted by several towers. The military cantonment lies to the northeast of the city. Agriculture and the breeding of cattle and buffaloes are the leading

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industries of the surrounding section. Population, in 1901, including cantonment, 42,330.

SAGASTA, sà-gäs'tà, PRAXEDES MATEO (1827-1903). A Spanish statesman, born at Torrecilla de Cameros. After following the profession of engineer at Valladolid and Zamora, he was elected from the latter city to the Cortes of 1854. His share in the uprising of July, 1856, forced him to flee to France, whence he returned, after being amnestied, to take a position in the faculty of the school of engineering at Madrid and to assume the editorship of the Progressist organ, *La Iberia*. From 1859 to 1863 he sat in the Cortes, and, as a stanch Liberal, participated in the struggle against the reactionary Government of Isabella II. After the rising of June 22, 1866, Sagasta again fled to France. Upon the outbreak of the revolution of September, 1868, Sagasta became Minister of the Interior in the provisional Government, attaching himself to Prim. He became president of the Cortes in October 1871, assumed the portfolio of the Interior in December, and from February to May, 1872, was head of the Ministry. He took office as Minister of Foreign Affairs under Serrano (q.v.) in January, 1874, and, after the latter made himself virtual head of the Government in the following month, became Minister of the Interior, and subsequently Premier. Upon the election of Alfonso XII. to the Spanish throne Sagasta resigned (December, 1874). In the following year, however, he appeared as the leader of those Liberals in the Cortes who rallied to the support of the new throne, and, upon the fall of Cánovas del Castillo, in 1881, was intrusted with the formation of a Cabinet. He remained in power till 1883, but failed to carry out any of the sweeping reforms advocated by the Liberal Party. After the death of Alfonso XII. he once more became Premier, and remained in power till 1890, signalizing his term of office by firmly repressing all attempts on the part of the military element to renew the anarchy of the years following the dethronement of Isabella II. The weakness of the Conservative Party afforded Sagasta another period of office from December, 1892, to March, 1895, his resignation being due to his inability to cope with the military situation in Cuba, where a new insurrection had broken out. In September, 1897, he was called to the head of affairs at a time when matters in Cuba were hastening to a crisis. The unhappy outcome of the war with the United States, which all his efforts could not prevent, led to his resignation in March, 1899. For the last time he assumed office in March, 1901. He resigned in December, 1902, after the young Alfonso XIII. had attained his majority. He died at Madrid, January 5, 1903.

SAGE (OF. *sauge*, *saulge*, Fr. *sauge*, from Lat. *salvia*, sage-plant, from *salvus*, safe, Gk. *ὅλος*, *holos*, OIr. *slán*, entire, Skt. *sarva*, all; so called from the healing properties attributed to it), *Salvia officinalis*. A perennial garden herb used to flavor dressings, sauces, etc. It is a half shrubby plant which grows on sunny mountain slopes in Southern Europe, and has long been in cultivation. The whole plant has a peculiar, strong, penetrating aromatic smell, and a bitterish, aromatic, somewhat astringent taste. It contains much essential oil (oil of sage). Sage grows best in a dry soil, and is easily propagated by slips or cuttings. Meadow clary, or meadow sage (*Salvia pratensis*), is a common ornament of meadows and borders of fields in most parts of Europe. The apple-bearing sage (*Salvia pomifera*) is a native of Southern Europe and of the East, remarkable for its large reddish or purple bracts, and for the gall-nuts (sage apples) which grow on its branches.

SAGE, HENRY WILLIAMS (1814-97). An American philanthropist. He was born at Middletown, Conn., studied medicine for a while, and in 1832 entered upon a mercantile career. He succeeded to the business of two of his uncles in Ithaca, N. Y., where he soon became recognized as one of its most enterprising business men. After the death of Ezra Cornell in 1874, he succeeded to the presidency of the board of trustees for the university. Besides the college hall for women and a chapel which bear his name, he gave Cornell a new library building with an endowment. He was the founder of the Lyman Beecher lectureship on preaching at Yale.

SAGE, RUSSELL (1816—). An American capitalist, born in Shenandoah, Oneida County, N. Y. He was educated in the public schools, and after serving as a clerk for several years he established himself in the wholesale grocery business in Troy in 1839. He served from 1841 to 1848 as an alderman in Troy, was for several years county treasurer, and in 1852 was elected to Congress as a Whig, and reëlected in 1854, serving on the Ways and Means Committee. Having become one of the leading wholesale merchants in the upper part of the State, he removed to New York City in 1863, purchased a seat in the Stock Exchange, and became largely interested in railroad investments. He became associated with Jay Gould (q.v.) in the control of the Wabash, the Saint Louis and Pacific, and other Western roads, and in the Western Union Telegraph Company and the Manhattan Elevated Railroad system of New York City.

SAGE-BRUSH. Certain drought-resisting plants. See ARTEMISIA.

SAGE-BRUSH STATE. Nevada. See STATES, POPULAR NAMES OF.

SAGE COCK. See GROUSE.

SAGE GROUSE. The largest of American grouse (*Centrocercus urophasianus*), which inhabits the sage-brush plains of Western North-America and the mountain valleys up to about 9500 feet. The full-grown cocks average about 2½ feet in length; the hens rather under two feet; the weight varies from three to six pounds. The tail equals, or rather exceeds, the wing in length, and consists of twenty very narrow acuminate feathers, stiffened and graduated in length from the middle pair outward. A more remarkable feature of the cock is the immense dilatable air-sac of naked yellow skin on each side of the neck, bordered by a patch of curiously stiffened, horny feathers, like fish-scales, often terminating in bristly filaments several inches long. The feet are feathered to the toes. The upper parts are varied with gray, black, brown, and tawny or whitish, and a noticeable mark is a broad black area on the under part of the adult. It is numerous in its habitat, and affords good sport with dogs, but its flesh is so tainted with the bitterness of the artemisia buds upon which it principally feeds (unless 'drawn' as

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soon as shot) as to be undesirable for the table. It also eats many insects, especially 'locusts.' It nests on the ground and lays elongated, heavily spotted eggs. Consult Coues, *Birds of the Northwest* (Washington, 1874). Compare GROUSE.

SAGE HARE. A jack-rabbit. See HARE.

SAGE SPARROW. One of the pale-colored desert sparrows of the genus Amphispiza, related to the song-sparrow, and inhabiting the sage-brush district of the Western United States.

SAGHALIEN, sä'gà-lyēn', or **SAKHALIN,** sä'kà-lyēn'. An island off the eastern coast of Siberia, extending from 46° to 54° 30′ N. latitude, and from 141° 30′ to 145° E. longitude (Map: Asia, O 3). It is separated from the Maritime Province on the west by the Strait of Tartary, which is only about five miles wide near the mouth of the Amur; and from the Japanese island of Yezo on the south by the Strait of La Pérouse, about 27 miles at its narrowest part. The island is of oblong shape and covers an area of over 29,000 square miles. The surface is largely mountainous, the elevations extending to the very sea. The western coast for the most part presents the appearance of a steep wall, varying in height from 100 to 200 feet, and is practically without indentation. The eastern coast is almost as precipitous as the western, but is more indented, and forms a number of lagoons. In the northern part of the island three separate mountain ranges are marked, two running along the coasts and one through the centre. They vary in altitude from 1500 to 3000 feet, and are densely wooded. In the centre there is a wide plain between the two coast ranges. Another mountain range runs along the eastern coast down to Aniva Bay, and still another covers the southeastern part of the island.

The rivers of Saghalien have the character of mountain streams, and are of little value as waterways. The chief rivers are the Tym, flowing in a northern and a northeastern direction and falling into the Sea of Okhotsk after a course of about 150 miles; and the Paranay, which falls into the Gulf of Patience on the eastern coast. Very little is known of the geology of the island, but extensive deposits of coal have been discovered, and some mines are worked near Dui, on the western coast. The climate varies in different parts of the island in accordance with the proximity of the locality to the mainland or to the Sea of Okhotsk. Thus the northern part which lies close to the mainland has a continental climate during the winter, when the narrow strait freezes over; and the eastern coast, subject to the cold currents of the Sea of Okhotsk, has a more severe climate than the western coast, which is affected principally by the Sea of Japan. In the central part the winters are very severe. The precipitation is abundant and the snow occasionally reaches a depth of seven feet.

Almost the entire surface of the island is covered with forests, chiefly coniferous. In the southern part are found some Japanese plants. The fauna of Saghalien does not differ essentially from that of Eastern Siberia. The rivers are well stocked with fish, and provide the natives with their staple food. Neither the climatic conditions of the island nor its soil are favorable to agriculture, and the area under cultivation at present is insignificant. The Russians, who are principally convicts, released convicts or exiles, engage chiefly in coal mining and lumbering. The convicts are employed in the coal mines and furnish the labor for the construction of roads and other improvements. The natives are engaged in fishing and hunting. Fishing on a large scale is carried on by the Japanese, who use herring for fertilizing purposes. The total population of the island in 1897 was 28,113 (7641 women), of whom 4979 (759 women) were convicts, 6934 exiles and 1566 released convicts. Prisons are maintained at the chief settlements of the island. The native population consists of about 2000 Gilyaks, who inhabit the northern part of the island; about 2500 Ainos (see AINO), the aborigines of Saghalien, found principally in the south; and a small number of Oroks of Tungus origin. There are also a number of Japanese and Chinese. The island forms a separate administrative district. The principal settlements are Alexandrovsk or Dui, the seat of the administration, Rykovskoie, Korsakov, and Muravievski.

The existence of Saghalien was first brought to the attention of Europe by the Dutch navigator Gerrit de Bries, about the middle of the seventeenth century. The southern part of the island belonged to Japan until 1875, when it was acquired by Russia in exchange for some of the southern Kurile islands. The island became a penal colony in 1869.

Consult: Fr. Schmidt, *Reisen im Amurlande und auf der Insel Sachalin* (Saint Petersburg, 1868); Poljakow, *Reise nach der Insel Sachalin*, 1881-82, trans. (Berlin, 1884).

SAG HAR'BOR. A village in Suffolk County, N. Y., 100 miles east of New York City; on Gardiners Bay, and on the Montauk division of the Long Island Railroad (Map: New York, H 5). It was formerly one of the most important whaling centres in America, but at present is best known as a summer resort. The leading industry of the village is the manufacture of watch cases. Population, in 1900, 1969.

SAG'INAW. The county-seat of Saginaw County, Mich., and the commercial metropolis and railroad centre of northern Michigan, 100 miles northwest of Detroit; on the Saginaw River, at the head of deep-water navigation (Map: Michigan, J 5). It is on both sides of the river, which is spanned by four railroad and five public bridges. The city covers an area of about 13 square miles, and its streets are well paved, principally with asphalt and brick. Several parks add to the attractiveness of the city, of which Hoyt and Riverside are especially noteworthy. The Hoyt Library with 24,000 volumes, the Public Library, the Germania Institute, and the Saginaw Valley Medical College are also prominent features. A free manual training school building, the gift of Hon. W. R. Burt, dates from 1903. It cost $200,000. Among the edifices of note are the Masonic Temple, the Court House, City Hall, Hoyt Library building, Saint Mary's Hospital, Arbiter Hall, the Germania Institute, and the Post Office building. The hospitals and charitable institutions include Saint Mary's Hospital, Saginaw General Hospital, Woman's Hospital, Home of the Friendless, and Saint Vincent's Orphan Home.

Saginaw was long known as one of the greatest lumber manufacturing centres in the country. The disappearance of the pine forests, however,

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has necessarily led to the abandonment of its saw-mills and to a change in the nature of its industry. There are still large firms engaged in the manufacture of rough and dressed lumber, and sash, doors, and boxes. With the passing of the lumber industry came the discovery of bituminous coal, the mining of which is now very important. More than 1,000,000 tons were mined in 1902. Three of the mines are within the municipal limits. A productive beet sugar district surrounds the city. In the census year 1900 the capital invested in the various manufacturing industries was $7,558,806, and the total output was valued at $10,034,499. This has been very largely increased since 1900, over $2,000,000 having been invested in new industries during 1902. Among the leading establishments are the Saginaw Plate Glass Company (the only one in Michigan), with a yearly capacity of 1,000,000 square feet, and immense beet-sugar factories, which were built at a cost of over three-quarters of a million dollars each. Besides lumber, glass, and beet sugar, there is a great variety of manufactured products. As an industrial point Saginaw ranks third in the State. Its railroads, radiating in eleven different directions, comprise seven divisions of the Père Marquette, three of the Michigan Central, and the Grand Trunk Railroad. The city is therefore the great distributing point for northern Michigan, and its wholesale houses are among the largest in the country.

Under the revised charter of 1897, the government is vested in a mayor, chosen biennially, and a unicameral council. The majority of the administrative officials are either appointed by the mayor or elected by the council. The school board, however, is chosen by popular vote. For maintenance and operation, the city spends annually about $450,000, the chief items being: Schools, $142,000; interest on debt, $57,000; streets, $40,000; police department, $38,000; and for the fire department, $35,000. The waterworks, which were constructed in 1872 at an outlay of $909,895, are owned by the municipality. Saginaw was created in 1890 by the consolidation of Saginaw City and East Saginaw. It was first settled in 1822. East Saginaw received a city charter in 1859. Population, in 1890, 46,322; in 1900, 42,345.

SAGINAW BAY. An arm of Lake Huron, 60 miles long and 20 miles wide, extending southwestward into the State of Michigan (Map: Michigan, K 5). It receives the Saginaw River (q.v.).

SAGINAW RIVER. A short river of Michigan, formed by several headstreams at Saginaw City, and emptying into Saginaw Bay after a course of about 20 miles (Map: Michigan, J 5). It is navigable up to the city for steamers drawing 10 feet.

SAGO (from Malay *sāgū*, *sāgu*, sago). A starch prepared from the pith of several species of palms (Mytroxylon, Borassus, Arenga, etc), natives of the East Indies. The pith constitutes a large proportion of the trunk and contains a considerable quantity of starch, which is elaborated by the plant as a reserve material. The tree must be cut down after blossoming, otherwise it is useless for the production of sago, as the starch is used by the tree for the growth and development of the seed. The pith, sometimes as much as 700 pounds from a single tree, is pounded in wooden mortars, the starch removed by washing with water and purified by sieving in the usual way. (See STARCH.) The finely divided sago (sago flour) is worked into a dough by kneading and forced through sieves upon hot greased pans to form pearl sago. The dough forms granules, which become covered with a paste made from some of the starch by the action of heat. The finished product consists of translucent globes. Sago has the following percentage composition: Water, 12.2; protein, 9.0; fat, 0.4; nitrogen-free extract (chiefly starch), 78.1; ash, 0.3. It is an important article of diet with the natives of the East Indies, and is largely exported to Europe and America for thickening soups, making puddings, etc. A peculiarity of pearl sago is that the grains swell and become still more translucent on cooking, but do not form a homogeneous paste. Imitation sago is made from potato starch and other starches.

SAGRA, sä'grȧ, RAMÓN DE LA (1798-1871). A Spanish economist and historian, born at Coruña. From 1822 until 1834 he was director of the botanical garden at Havana, Cuba, and then became an editor at Madrid. Among his numerous works are: *Historica económica, política y estadística de la isla de Cuba* (1831); *Historica física, política y natural de la isla de Cuba* (2 vols., 1837-42); and *Icones Plantarum in Flora Cubana Descriptorum* (1863).

SAGUA LA GRANDE, sä'gwȧ lȧ grän'dȧ. A town of Cuba, in the Province of Santa Clara, situated on the Sagua River, 5 miles from the north coast and 30 miles north of Santa Clara (Map: Cuba, E 4). It is a comparatively modern town with wide streets, and has machine shops and lumber yards. The main article of export is sugar. The town is connected by rail with Santa Clara and Havana. Population, in 1899, 12,728, mostly whites, and a considerable number of Chinese.

SAGUENAY (säg'*e*-nā') **RIVER.** A large tributary of the Saint Lawrence River, falling into the estuary, on the north side, about 115 miles below Quebec (Map: Quebec, F 2). It is the outlet of Lake Saint John, though its name is sometimes extended to the Chamouchouan, the main feeder of the lake, rising 150 miles to the northwest of it. The length of the Saguenay below the lake is about 130 miles. It leaves the lake in a series of rapids, and for the first 36 miles is a narrow stream running between densely wooded hills. At Chicoutimi it widens out into a tidal estuary or fiord about two miles wide, and for the rest of its course it passes between bare and gloomy cliffs, rising to a sheer height of 1000 to 1800 feet, and broken here and there by deep, wooded, but equally gloomy cross valleys. The water in this fiord has a mean depth in mid-channel of 800 feet, and in some places the depth exceeds 2000 feet. The largest ships can ascend to Ha Ha Bay, a few miles below Chicoutimi.

SAGUN'TUM (Lat., from Gk. Ζάκανθος, *Zakanthos*). An ancient town, near the eastern coast of Spain, on an eminence near the mouth of the Pallantias (modern Palancia), about midway between the mouth of the Ebro and New Carthage (Carthagena). Later tradition attributed its

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foundation to Greeks from Zacynthus and Rutulians from Ardea. In reality there seems no reason to doubt that it was an Iberian city, with an admixture of Greek culture due to its commerce. It owes its historical importance to its connection with the outbreak of the Second Punic War. The town had been received into alliance by the Romans, apparently after the treaty of B.C. 226, which bound the Carthaginians not to cross the Ebro. Hannibal, who saw that war must come, attacked the city, which had refused to acknowledge the Carthaginian supremacy, in B.C. 219. After a desperate defense for eight months, the skill of the Carthaginian general prevailed. The Romans thereupon demanded the surrender of Hannibal for attacking their ally, and, upon the refusal of the Carthaginians, declared war. The ruined town was subsequently rebuilt by Scipio Africanus, and appears as a *municipium* under Augustus. The ancient walls (*muri veteres*) gave rise to the name of the modern town, Murviedro (q.v.).

SAHARA, sä-hä'rä (Ar. *sähira*, desert), THE. The largest continuous desert on the earth's surface. Extending east and west between the Atlantic Ocean and the Red Sea, and north and south between the Sudan and the Mediterranean countries, whose southern borders overlap it, the desert embraces an area of 3,510,000 square miles, being nearly as large as the European mainland (Map: Africa, E 2). In the last quarter of the nineteenth century it was proposed to convert the western Sahara into an inland sea by admitting the waters of the Atlantic through a canal south of Morocco. It is now known that the mean elevation of this part of the desert is at least 1000 feet above the sea, that the lowest part of the region it was expected to submerge is 500 feet above the sea, and that the area below sea level is comparatively insignificant. The recent discovery of fossils and limestone deposits of Cretaceous and Tertiary times extending over a wide area of the southwestern part of the Sahara has led Professor de Lapparent to the conclusion that the Tertiary sea must have extended inland at least as far east as Lake Chad. He mentions other facts also that point to an unbroken sea communication between India and the central Sahara by way of Egypt in Cretaceous and Tertiary times.

The surface of the Sahara is not, as was once supposed, merely a monotonous and comparatively level waste of sand. Its surface presents, on the contrary, considerable variety of aspect which makes it possible to divide it into five natural groups: (1) The western Sahara, (2) the mountain lands of the central Sahara, (3) the Libyan waste, (4) the Nile lands, and (5) the mountain zone east of the Nile. As a whole, the Sahara is a tableland whose surface has an average elevation of 1300 to 1600 feet above the sea, with only limited areas falling to 500 or 600 feet, and a few small depressions below the sea level.

The most northern of the depressions beneath the sea level are the salt lakes or marshes (shotts) in the southern part of Tunis. They contain scarcely any water and are 50 to 90 feet below the level of the Mediterranean. This is now a region of date palms nourished by the springs which gush from the neighboring hills. In the eastern part of the Libyan desert is a series of deeply depressed oases sharply defined by the precipitous walls of the plateau: Aradj, 230; Siva, 98; Sittra, 82; Uttiah, 66; and the Birket el Kerun, in the Egyptian Fayum, near the Nile, 131 feet below sea level. These are the only depressions, except one, beneath sea level in Africa. A strip of considerable breadth extending along the Atlantic fringe of the western Sahara from the Senegal River to Morocco may be classified as lowland (not more than 650 feet in elevation). Another strip of lowland stretches from the shotts of Tunis to the Nile.

The chief distinction between the western Sahara and the Libyan desert is that the larger part of the western Sahara is steppes while the Libyan desert, excepting its depressed oases, is almost purely a sand waste. The two regions are separated by the great highlands of the central Sahara. About two-thirds of the western Sahara is composed of sterile, rock-strewn plains, and the remainder is sand waste, the plains or steppes extending across the desert from northeast to southwest, the sand desert being interspersed among them. There are many deep valleys, the beds of streams flowing from the Atlas ranges or from the western slopes of the highlands of the central Sahara, some of the northern wadais or rivers carrying at times considerable water a short distance into the desert; but the water in most of the basins sinks through the permeable strata to an impermeable one of clay, forming vast subterranean reservoirs needing only to be tapped to spread life and wealth over the surrounding surface. The oases are situated above these underground supplies and may be extended wherever water can be brought to the surface. The most remarkable of these tracts is El Erg, whose wells are capable of irrigating as many as 8,000,000 date palms. The oases embrace only about 80,000 square miles, or only a little more than one-fortieth of the desert area. The lines of wells that make a number of caravan routes across the western Sahara possible are found along the courses of these subterranean water supplies. The valleys show that at an earlier period the climatic conditions permitted far larger volumes of water to flow on the surface; and evaporation has produced numerous salt pans, particularly in the west and south.

The plateau of the central Sahara, which extends three-fourths of the way across the desert from northwest to southeast, is from 1900 to 2500 feet in elevation, and above it rise mountain ranges (Ahaggar, Tibesti, and Air), some of the peaks being 6000 to 9800 feet high, and snow-crowned in winter. The Ahaggar mountain land is the source of several long, wide river valleys, now waterless above ground, but contributing their subterranean supplies for the creation of a series of wells. East of the mountains to the Nile extends the Libyan waste, waterless, barren, almost devoid of life save for its few inhabited oases, its sand dunes, often piled up by the winds to a height of 300 or 400 feet, stretching away to the Nile. This sand waste, remarkably difficult to cross, has been characterized by Rohlfs as the most treacherous and tediously monotonous region of the Sahara. The Nile lands and the eastern mountains are described in the articles EGYPT and NILE.

The Sahara is dry in winter because it is then an area of high pressure, forcing the air currents

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outward in all directions and so receiving little moisture from the seas; and in summer, because the intense heat over the desert expands the air so that it is like a sponge, absorbing moisture instead of parting with it. There is, however, considerable precipitation in the region of the central mountains. There are four months of winter and eight months of summer. The range of temperature is large for a tropical region. Owing to the intense radiation, the hottest days are often succeeded by cool nights.

Except in the oases the desert is almost devoid of vegetation save for stunted and thorny shrubs in the western Sahara. One of the commonest shrubs is the gum acacia. Wild animals are also rare, though the Sahara is preëminently the home of the domesticated camel, and the southwestern part of it is particularly well adapted for the ostrich. The game includes gazelles, wolves, hyenas, foxes, jackals, wild boars, and leopards. Granite, quartzite, and porphyry are everywhere the predominant rocks, as far as is yet known, except the Tertiary limestones along the Barka coastline of Tripoli and the similar formations newly discovered in the southwestern part of the desert. The date palm is the staple product of the oases and the principal source of revenue in the Sahara. Under the shade of the palm trees the natives raise some wheat, barley, and vegetables. Cotton produced in most of the oases is the chief fibre used for native spinning and weaving. The coarse fibre esparto (alfa) thrives on the Saharan steppes of Southern Algeria and Tunis, and is an article of export. The chief mineral riches is salt, formed by evaporation in the salt pans of the south and west, in inexhaustible reservoirs that supply the whole Sudan. One of them in El Juf is 30 miles long by 12 broad; 20,000 camel-loads of salt are extracted from it annually. Camels, sheep, goats, horses, donkeys, and a few cattle are the domestic animals.

Excepting dates and salt, the commerce of the Sahara itself is insignificant, but the desert is the highway for considerable trade between the Sudan and Morocco and Tripoli. The chief trade routes (along the lines of wells) are (1) from Tafilelt (for Morocco and Algiers), via Tuat, to Timbuctu; (2) from Gadames (for Tunis and Tripoli) to Tuat and Timbuctu on one hand and to Sokota and Kano on the other; (3) from Murzuk or Tripoli, via Bilma, to Kuka, near Lake Chad, the most frequented of all the desert routes; (4) from Bengazi, via Ujila, to Wara, in the Kingdom of Wadai; (5) from the Nile Valley, via numerous oases parallel to it, to Darfur. Another great camel route skirts the northern fringe of the desert and connects the principal inland towns of the Mediterranean States. The west is inhabited by Moorish tribes (Berbers), the centre by Tuaregs, the most formidable robbers of the desert and the greatest impediment to peaceful trade, and the east by Tibbu (Sudanese negro stock) and Bedouins. By a convention between Great Britain and France, the right of France to all of the unappropriated Sahara west of the Nile basin has been recognized. The French Sahara includes about three-fifths of the desert, the remainder belonging to Spain (a part of the Atlantic coast), Morocco, Tripoli, and Egypt. No estimates of the population of the Sahara are given.

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SAHARANPUR, sä-hä'rŭn-pōōr', or **SEHARUNPOOR.** The capital of a district of the same name in the United Provinces of Agra, India, 111 miles north by east of Delhi, on the Damaula Nadi River, near the Doab Canal (Map: India, C 2). The surrounding section has been made very fertile by means of irrigation and produces grain, cotton, and sugar-cane. Saharanpur is the commercial centre of this region and also carries on considerable trade in native textiles. Population, in 1901, 66,254. The city dates from the fourteenth century, and during the Mogul régime was a popular summer resort. It was for a time under the control of the Sikhs, and came under English sway in 1804.

SAHUAYO, sä-wä'yō. A Mexican town of the State of Michoacan, 60 miles southeast of Guadalajara, on the southern margin of Lake Chapala. It was conquered by Nuño de Guzman in 1530. The population in 1895 was 8443.

SAI. One of the many native South American words applied to monkeys. This one seems to be a general term for 'monkey' and to lie at the root of many names, such as 'saimiri,' 'sahui,' 'sajou,' 'saguin,' 'saki,' 'sapajou,' 'ouakari,' and similar terms which have come down to us through the writings of various early European travelers, by whom they have been variously spelled and changed.

SAID PASHA, sä-ēd' pä-shä', MEHEMED (1835—). A Turkish statesman, born in Constantinople. He served under Fuad Pasha in Syria in 1860, became Governor of Cyprus, and commanded a corps in the Russo-Turkish War. He was afterwards made Secretary of State and member of the Reform Commission by Abdul Hamid II. In 1879 he became Prime Minister, was removed the following year, but returned quickly to power and remained in office till May, 1882. He was restored to his post in July of the same year, and in December became Grand Vizier, holding this office till 1885, and again for a few months in 1895.

SAI'GA (Russ. *saïga*, antelope). An interesting antelope (*Saiga Tartarica*) with an extraordinary inflated nose, due to the size and position of the nasal bones, inhabiting the steppes of Asiatic Russia south of 55° N. The sheep-like expression is more pronounced in the females, as the male has erect, annulated horns (see Colored Plate of ANTELOPES); there is a thick tuft of hair beneath each eye and each ear, and the animal's coat is fleecy. In some of its habits also it resembles sheep, especially in jumping and butting. This antelope inhabited Western Eu-

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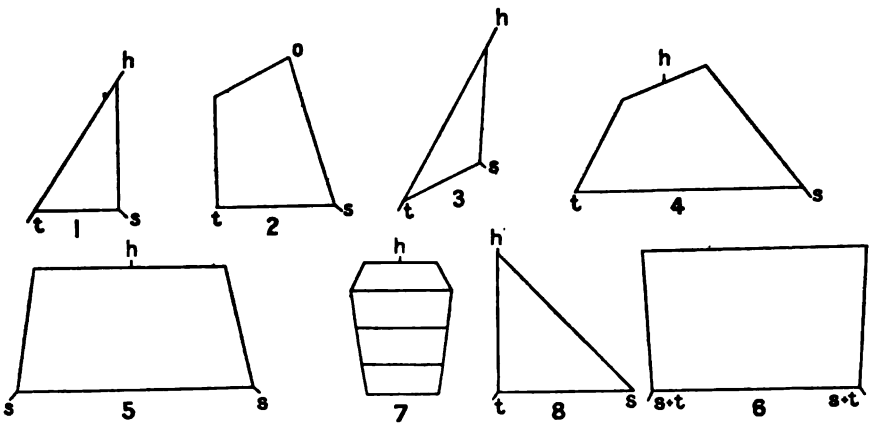
rope as late as the time of Paleolithic man, and was doubtless one of the objects of his chase. Its remains are common in caves of France and Belgium, and have been found in Great Britain, and at least one sketch of the head of the animal has been found upon a bone.

SAIGON, sī′gŏn′. The capital of the French possession of Cochin-China, on the River Saigon, in latitude 10° 50′ N. and longitude 106° 32′ E. (Map: Asia, K 7). It is forty miles from the coast. Its excellent harbor makes it accessible to the largest steamers. The city is in three parts: Government town, the colony, and the native town. The European portion is elegantly built with broad, regular streets and fine public buildings, including the cathedral, Governor's Palace, the Palace of Justice, hospital, and Chamber of Commerce. Two fine gardens overlook the town, the Governor's and botanical, the latter containing a noteworthy collection of plants. There are two colleges, an arsenal, a fine dry dock, machine shops, foundries, three banks, and two steam rice mills. Communication with the world is amply provided by cables and steamship lines. Most of the commerce is at Cholon, four miles distant, and connected with Saigon by steam tramways. It is a great rice market and has a number of large rice mills. Its population in 1901 was about 127,000, chiefly Annamese and Chinese. The population of Saigon in 1900 was nearly 51,000, including over 3000 Europeans. Saigon was the capital of Cochin-China while it was still under native rule. The French captured it in 1858, and it was formally made theirs by treaty in 1862, when it became the capital of their possessions instead of Touraine.

SAIGO TAKAMORI, sī′gō tä′kä-mō′rē (1826-77). A Japanese general, born at Kagoshima, Kiushiu, in 1826. He was educated chiefly in Kioto. He was one of those patriots who desired the overthrow of the Shogunate, the restoration of the Mikado to his proper place as the sole ruler of the Empire, and the expulsion of foreigners. He soon took an influential position in his clan, but his views earned for him the displeasure of the Shogun's Government, and when about to be seized he was banished for safety by his own clan to the island of Oshima (q.v.). In 1863 he was recalled and placed at the head of the Provincial Government. In the civil war which resulted in 1868 in the abolition of the Shogunate, he was found fighting with distinction on the Imperial side. In 1873 he was named commander-in-chief of the land forces, but ere long, becoming dissatisfied with the new Government and its adoption of so many foreign ideas, he retired to Kagoshima. Here he established a great 'private school,' ostensibly for the promotion of learning, but really for the training of soldiers to be used in an attempt to revert to the former form of government, with the Satsuman clan and himself at its head under the Mikado. In February, 1877, they broke out in open rebellion with Saigo as leader. The struggle lasted until September 24, when Saigo's forces were utterly defeated and his chief officers slain in battle. Posthumous honors were granted him in 1890.—His brother, SAIGO TSUKUMICHI, also a soldier, was born in Satsuma in 1843, led the Japanese expedition to Formosa in 1874, and was a general in the Imperial army engaged in suppressing the Satsuma Rebellion (see above). From 1879 to 1900 he was a Cabinet officer.

SAIL (AS. *segel, segl*, OHG. *segal*, Ger. *Segel*, sail, of uncertain etymology). A contrivance of canvas, matting, or similar material designed to utilize the pressure of the wind in the propulsion of vessels. Sails are generally made of flax or cotton canvas, but in China, and in many partly civilized countries, they are made of grass, or fibre mattings. While sails are made in various shapes, they are usually triangular or quadrilateral.



TYPES OF SAILS.

(1), A staysail of ordinary cut; (2), a schooner's foresail or mainsail, a sloop's mainsail, a spanker, etc.; (3), a jib; (4), a lug sail; (5), a topsail, topgallant sail, etc.; (6), a square foresail or mainsail; (7), a Chinese junk's sail having battens or bamboos across it to keep it flat; (8), a leg-of-mutton sail.

The letters *h*, *s*, *t*, attached to the various figures, indicate the position of the halliards, sheets, and tacks. Some sails are not hoisted, therefore they have no halliards; others are drawn down by their sheets alone and have no tacks; some, which are secured to booms, have the sheets secured to the boom instead of the sail, and some have both tacks and sheets at the same corner. The tack is a rope which secures the forward lower corner of a sail. In the case of square sails, which secure to yards above and

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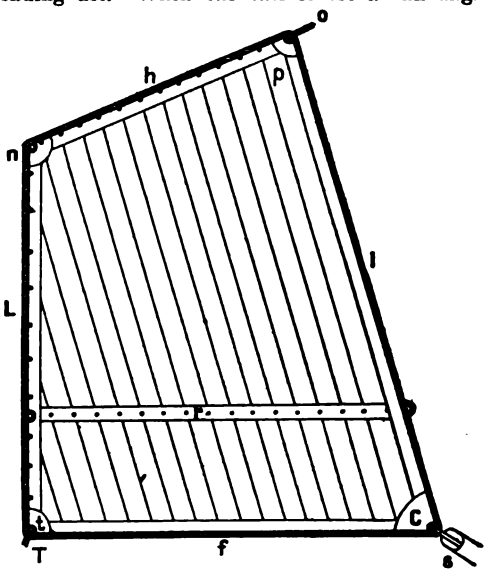
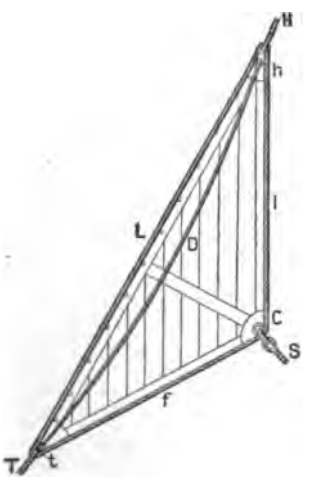
below, the ropes at each lower corner are called sheets; but square sails which hang from a yard and have no yard below them have tacks leading forward from their lower corners and sheets leading aft. When the sail is set at an angle



FORE-AND-AFT SAIL—MAINSAIL.

with the keel, one tack is hauled forward and one sheet is hauled aft.

Typical sails on a larger scale than in the diagram are shown in the accompanying figures, and the letters indicate parts of the sail and the ropes called "gear" attached to it: B, buntline; *b*, bowline; C, clew; *c*, clewline; D, downhaul;



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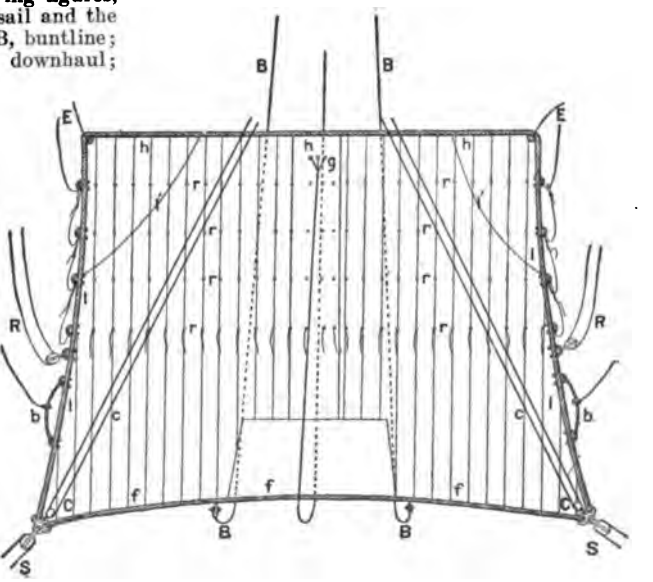

TOPSAIL, AFTER SIDE.

E, head-earing; F, foot of sail; *g*, bunt-glut for bunt-whip; H, halliards; *h*, head of sail; L, luff of sail; *l*, leech of sail; *l'*, leechline; *n*, nock or throat of sail; *p*, peak of sail; R, reef-tackle; *r*, reef-band of sail, carrying reef-points; S, sheet; T, tack, the rope which secures the corner of the sail (also called the tack) *t*, to the deck or mast.

Canvas sails are made up of narrow strips (called 'cloths') of canvas running up and down the sail. These are lapped about an inch and a half and both edges sewn with an overhand stitch. Around the edges of the sails are additional canvas strips called tabling, clew patches, etc.; and across it are strain-bands, buntline cloths, reef-bands, etc. The edges of the sail are strongly sewed to the 'roping,' which goes entirely round and adds greatly to the strength as well as serving to attach the gear to the sail.

As applied to ships, sails are of two types, 'square' and 'fore-and-aft.' Square sails are bent to yards which pivot about their middle. Fore-and-aft sails pivot at the forward edge (or near it in the case of lug-sails), and are bent to gaffs, masts, or lugs, or are hoisted on stays. A vessel can carry more canvas if square-rigged, but the sails are heavier and less easy to handle, and a fore-and-aft rigged vessel can usually lie nearer the wind in sailing. Square-rigged vessels, in addition to their square sails, have some fore-and-aft sails, as the jibs, staysails, trysails, and spanker. See SHIP.

The lower sails of a square-rigged vessel are called the courses; they consist of the foresail and mainsail (and, in some ships, the mizzen or cross-jack). The sails above these are the topsails—fore, main, and mizzen. Above the topsails are the fore, main, and mizzen topgallant sails; and above these again the fore, main, and mizzen royals. In some very lofty merchant ships there are skysails above the royals. In recent years the merchant practice has been to cut the topsail in two parts, called the upper and lower topsails. This plan saves reefing close down—instead of reefing, the upper topsail is furled. Moreover, the sails are of less unmanageable dimensions for handling with small crews.

Sails are hoisted with ropes called halliards; hauled out flat with sheets or outhauls (on booms and gaffs); pulled up to the yard for furling by means of clewlines (at lower corners), buntlines (made fast at foot), leechlines (at side), and bunt-whip (middle); and pulled

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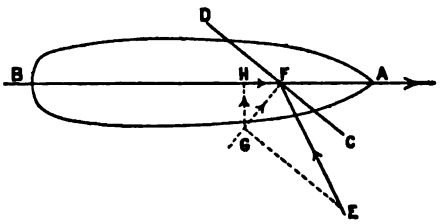
up to the yards for reefing by reef-tackles. Square sails are bent to iron rods (called bending jack-stays) on the yards with rope-yarn stops called robands; fore-and-aft sails are bent to travelers or hanks sliding up and down stays or railways (on masts), or to hoops sliding up and down the masts. Fore-and-aft sails are either lowered when furled or pulled in and furled up and down the mast. In the latter case they are pulled in by the brails. Jibs and staysails are hauled down by down-hauls. When the force of the wind reaches a certain point, the light sails are furled and the other sails reefed by tying up parts of each to its yard or boom by means of small, short ropes called reef-points. In severe storms, heavy sails of small area called storm sails are bent in place of certain of the ordinary sails, which are used except in very strong winds. In the severest hurricanes no sail can be carried —except, possibly, a tarpaulin laid against the mizzen rigging, which serves to keep the vessel partly up to the seas.

The action of the wind upon the sails is best shown by a diagram. Let AB represent a ship moving in the direction BA; CD one of her sails;



EF the apparent direction of the wind. Then if EF represents in length the force of the wind, GF will be the resolved component at right angles to the sail, and HF the effective resolution of this component applied to pushing the ship ahead. The component GH will tend to push the ship sideways (give her leeway) or heel her over. It is evident that, as the wind draws aft, less of its power is lost, but with the wind aft is not usually the best point of sailing, as the sails will not all draw in this position. Most ships sail best with the wind between the quarter and the beam. Some fore-and-aft sails are in two parts—a broad strip along the foot being laced to the upper part. To reduce the area of the sail, instead of reefing by drawing up the foot and tying it with reef-points, the broad strip mentioned—which is called a bonnet—is removed.

SAILER, zī'lēr, JOHANN MICHAEL (1751-1832). A Roman Catholic theologian, born at Aresing, in Upper Bavaria. He entered the priesthood and in 1780 was made professor of dogmatics at Dillingen. In 1794 he was removed from his chair because of his mysticism, and in 1799 was appointed professor at the seminary of Ingolstadt, which removed in 1800 to Landshut, where he remained until 1821, when he became prebendary of Regensburg. In 1829 he became bishop of the same see. His influence was very great throughout Germany in behalf of renewed spiritual activity within the Roman Catholic Church. His complete works were edited by Widmer (1830-42). Consult the biography by Messmer (Mannheim, 1876).

SAILFISH (so called from the shape of the dorsal fin). (1) A fish (*Istiophorus nigricans*) of the warmer waters of the Atlantic, especially about the West Indies, where it is called 'spike-fish,' 'boohoo,' and by various Spanish names. It is very similar in character and habits to the swordfishes (q.v.), but has a shorter and less flattened sword and the skin is rougher. Several other species are known in Eastern waters. See Plate of SPEARFISH AND SWORDFISH.

(2) A carp-sucker. See SKIMBACK.

SAILINGS. The term applied in navigation (q.v.) to the different methods of conducting a ship from one point to another and the solution of problems connected with these methods. They are (a) plane sailing; (b) traverse sailing; (c) parallel sailing; (d) middle latitude sailing; (e) Mercator sailing; (f) great circle sailing. So far as the track of the ship is concerned, the first five of these are identical, for in all of them the ship's track is along the rhumb-line or loxodromic curve; these sailings, therefore, are merely different methods of computation of the same problem. In great circle sailing, however, an attempt is made to follow the great circle of the earth which passes through the points of departure and arrival.

In *plane sailing* the small portion of the earth under consideration is regarded as a plane.

In the figure let W be the point of departure and A the point of arrival. Then if NS is a north and south line (part of the meridian through W), the angle NWA is the course. Draw WE perpendicular to NS and AE parallel to NS. If we regard as a plane the portion of the earth's surface under consideration, the vessel in moving from W to A will have changed her latitude by an amount equal to AE and her longitude by an amount equal to WE. If we designate WA (the distance sailed) by d, AE (the change in latitude) by l, and WE (the distance gained in the direction in which longitude is measured) by p,

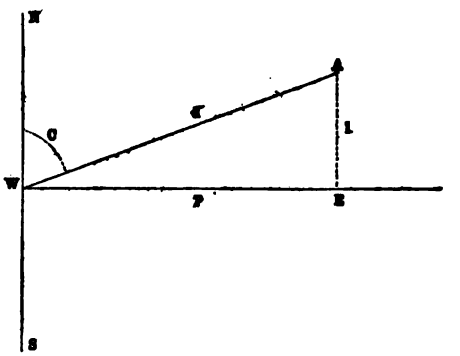


FIG. 1.

we shall have $l = d\cos C$ and $p = d\sin C$. AE, or l, is called the 'difference in latitude;' AW, or d, the 'distance;' and WE, or p, the 'departure.' If d is expressed in nautical miles and C in degrees, l will be given in minutes of latitude. (This is not exact, but the error is inappreciable in practice.) The departure, or p, will also be given in nautical miles. The method of determining the relation between the departure (p) and the difference of longitude (D) is given under 'traverse sailing.'

Traverse sailing consists in computing the total

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gain in latitude and in departure when the ship's track is made up of several pieces, the whole track being called a 'traverse.'

In Figure 2 W is the point of departure and H the point of arrival; and WABFGH is the ship's track. The total gain in latitude is equal to $(l_1 - l_2 + l_3 - l_4 + l_5)$. The total gain in departure is equal to $(p_1 + p_2 + p_3 - p_4 + p_5)$. Each value of p and l may be computed from its own triangle.

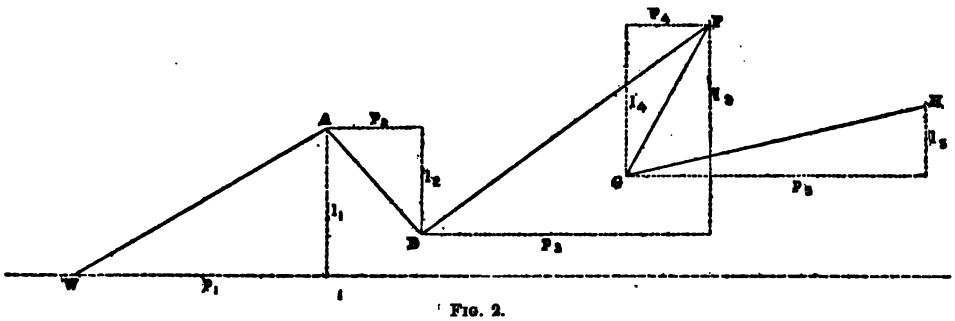

Fig. 2.

In sailing due east or west along a parallel of latitude the difference of latitude (i.e. l) is zero and $p = d =$ distance sailed. But p is expressed in nautical miles. To determine how many minutes of longitude to which it corresponds, we must determine the length of a minute of longitude.

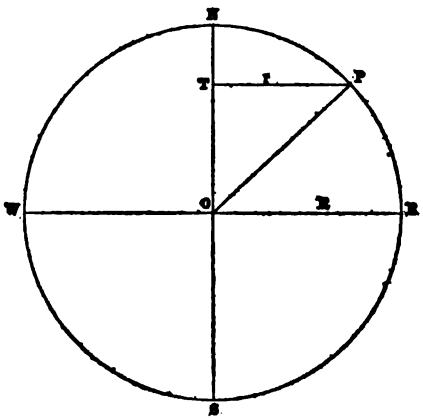

Fig. 3.

In Fig. 3, W N E S is the meridian of the earth passing through the point P. OE = R = the equatorial radius of the earth. TP = r = the radius of the circle of latitude passing through the point P.

$$\frac{\text{Circumference of circle of latitude}}{\text{Circumference at equator}} = \frac{2\pi r}{2\pi R}.$$

Each of the circumferences is divided into the same number of minutes of longitude, therefore

$$\frac{x'}{x} = \frac{\text{length of a minute of longitude at P}}{\text{length of a minute of longitude at equator}} = \frac{r}{R}$$

Since the earth is very nearly a sphere, we may without serious error assume it to be so. (See Latitude and Longitude.) Then we have angle TPO = angle POE = L = latitude of P (nearly); also OP = OE (nearly); and $\cos L = \frac{r}{R}$, or $x' = x\cos L$. If p (= departure) correspond to a certain number of miles measured along the parallel of latitude, then p is equal to $\frac{p}{\cos L}$ minutes of longitude, or if we call the difference of longitude D, we have $D = p\sec L$. Having obtained the value of p by means of the formulæ of plane and traverse sailing, we find D by the formula $D = p\sec L$. The value of l, p, and D may be picked out of a table of right triangles such as is given in Bowditch's *Navigator* and other works of the kind, or the triangle may be solved in the usual trigonometrical manner.

Parallel Sailing is a special case of plane sailing or traverse sailing in which the course is east or west along a parallel of latitude. The formulæ may be deduced from those for traverse or plane sailing by putting C = 90°.

The latitude (L) used in the foregoing formulæ is that of the point of departure. If the distance sailed is considerable and the change in latitude more than a few miles, it is evident that the resulting difference of longitude will be considerably in error, for the length of a minute of latitude at the latitude L differs from the length of a minute at L′ (the latitude at the point of arrival). The exact average length of a minute of longitude is slightly greater than the mean of its lengths at the latitude of L and L′ and slightly less than its length at the latitude of $\frac{L + L'}{2}$, but the error is not large for ordinary cases, and it is customary to use the formula $D = p\sec\left(\frac{L + L'}{2}\right)$; and this, together with $l = d\cos C$ and $p = d\sin C$, which have already been given, constitute the formulæ used in computing a ship's position by 'dead reckoning' (q.v.) when the latitude and longitude of the point of departure and the courses and distances sailed are known. Thus, suppose a ship leaves a place of which the latitude is 30° N. and the longitude 60° W. and sails northeast 100 miles and then S.S.E. 60 miles; required, the latitude and longitude of the place of arrival. The following table is prepared:

COURSE (C)	Distance (d)	Diff. lat. (l)	Dep. (p)	Diff. long. (D)
N.E.....	100	+70.7	—70.7	—82.1
S.S.E.....	60	—55.4	—23.0	—26.8
		+15.3	—93.7	—108.9

The latitude of the place of arrival is therefore 30° 15′ 18″ (30° + 15′.3), and the longitude

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58° 11′ 06″ (60° — 1° 48′.9). When the distances sailed are short it is customary to find the sum of the departures and pick out (from the table of right triangles) the difference of longitude corresponding to the sum, using the mean of the latitudes of the place left and the place reached. While not so exact, it is sufficiently so for ordinary purposes of navigation; in the example under consideration the error would be about one-half a minute of longitude.

Mercator Sailing is a more accurate method of determining the latitude and longitude of the place of arrival, or the course and distance between places of which the latitude and longitude are known. A complete demonstration of the method requires too much space for insertion in this work. The formulæ used are: $l = d\cos C$; $L' = L + l$; $p = d\sin C$; $m = M' - M$; $D = m \tan C$; $\lambda' = \lambda \pm D$. In these formulæ the symbols have the same meaning as in the other sailings. In addition, M and M′ are the meridional parts or augmented latitudes corresponding to the latitudes of the point of departure and point of arrival respectively; and λ and λ′ are the longitudes of these points. In the accompanying sketches Fig. 4 is designed to show the

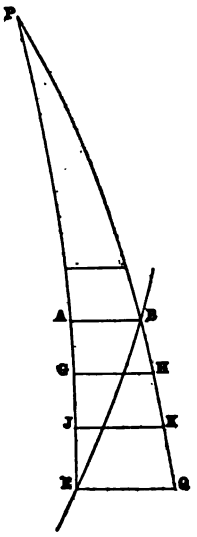

Fig. 4.

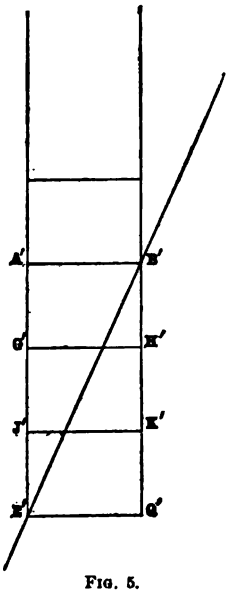

Fig. 5.

actual shape of a segment of the earth in which P is the pole, EQ a portion of the equator, PE and PQ meridians, and AB, GH, and JK portions of parallels of latitude. Fig. 5 represents the same segment of the earth on Mercator's projection. E′Q′ is equal to EQ, as are also J′K′, G′H′, and A′B′. In Fig. 4 the line EB is a portion of a loxodromic curve or rhumb-line passing through E and B and making the same angle with the meridians PE and PG and all the other meridians. In Fig. 5 the angles between the lines E′B′ and A′E′, and E′B′ and B′Q′, are preserved; and, in order that this condition shall hold—since A′B′ is longer than AB, and since A′E′ and B′Q′ are parallel—it is necessary that A′E′ and B′Q′ be longer than AE and BQ. A′E′ and B′Q′ are called the *augmented latitudes* of the points A and B; similarly G′E′, H′Q′, J′E′, and K′Q′ are the augmented latitudes of the points G, H, J, and K. It follows from the foregoing that the loxodromic line is a straight line when laid down on a Mercator's chart, and this is what makes the charts constructed upon that projection so convenient and so widely used. While Mercator's charts are almost universally employed for ocean navigation, Mercator sailing is used very little. The ordinary unavoidable errors of navigation are sufficiently large to render the slight superiority in accuracy over middle latitude sailing of no practical value, except where the distances are very great or where the ship's track crosses the equator between the points of arrival and departure.

In *great circle sailing* a ship is made to follow as closely as practicable the arc of the great circle of the earth passing through the points of departure and arrival. Since the shortest line between any two points of a sphere is the arc of a great circle passing through the points, it follows that a ship which moves from one point to another on the earth's surface will pass over the shortest route when she follows the arc of the great circle passing through those points. Theoretically, therefore, ships should always sail on great circles. Practically, this is impossible, and is not even generally desirable. Great circles make different angles with every meridian they cross, so that the course would be constantly changing. To effect this constant change would be difficult and very troublesome. Furthermore, to follow the great circle rigorously would often lead the ship into bad weather or dangerous localities or into regions where the currents and winds are adverse. The sole advantage is the shortening of the distance sailed. By determining points on the circle and sailing along the rhumb-line from point to point, the distance passed over may be made substantially the same as on the great circle, provided the rhumb-line tracks be made sufficiently short. In many cases it is desirable to follow quite closely the great circle for some distance and then the rhumb-line course to some distant point on the circle, which is again followed quite closely to the designed point of arrival. For instance, the great circle from Puget Sound to Yokohama runs through the Aleutian Islands and into a region of fog. For this reason steamers do not follow it throughout, but only as far north as desirable, when they take the rhumb-line course to meet the great circle again (a long distance to the westward) in about the same latitude; from this point they follow it in short rhumb-line tracks to the destination.

The determination of numerous points upon the great circle involves considerable computation work, and, while not difficult, it is beyond the capacity of rule-of-thumb navigators. To adapt great circle sailing to the comprehension of such navigators and to avoid laborious computation, many devices have been invented, such as charts on the gnomonic projection, the sphero-graph, great circle protractors, etc. Of these, the gnomonic charts are decidedly the simplest and most practical. The projection is upon a plane tangent to the earth at some selected point on the surface, and the point of sight is the centre of the earth. As all planes cutting great circles out of the earth pass through the earth's centre, they also pass through the point of sight; and

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the lines they cut in the plane of projection are straight lines. It is evident, therefore, that the straight line joining any two points on the chart is the projected great circle arc. The meridians and parallels of latitude being properly projected on the chart, it is very easy to obtain the latitude and longitude of as many points of a great circle arc as we wish. These points may be transferred to a Mercator chart and the courses between them obtained in the usual way, or they may be determined from the gnomonic chart itself, but this is usually unnecessary. The development of the gnomonic chart for use in great circle sailing is due to the late Gustave Herrle, chief draughtsman, and G. W. Littlehales, chief of the division of chart construction in the Hydrographic Office, United States Navy Department.

Various other means of graphically solving great circle problems have been devised. Probably the earliest was the 'great circle protractor' of Prof. W. Chauvenet, United States Navy. About the same time Mr. Stephen Martin Saxby of the British Navy designed a very similar instrument, which was called the spherograph. Capt. C. D. Sigsbee, United States Navy, designed a great circle protractor many years later, and recently devised a new form of it which is now issued by the Hydrographic Office of the United States Navy. All of these inventions utilize the stereographic projection of a hemisphere in which the meridians and parallels of latitude are shown.

The spherograph consists of a card upon which is the stereographic projection of a hemisphere with the meridians and parallels of latitude drawn and marked. Over this, and pivoted by a pin upon the same centre, there is an exactly similar projection of a hemisphere upon a transparent disk. All the meridians are great circles; therefore, if we consider the bounding meridian of the lower projection as that of the place of departure and mark the point upon it at the proper latitude, it is very easy to obtain the great circle leading to any other point as follows: Turn the transparent disk until its pole falls upon the marked point of departure. Every meridian of the transparent disk is now a great circle. If the point to be arrived at is marked on the lower disk in its proper latitude and longitude (reckoning the latter from the meridian of the point of departure), the meridian of the transparent disk which passes through it is the great circle connecting it with the point of departure. It is evident that this instrument is capable of graphically solving spherical triangles and other astronomical problems.

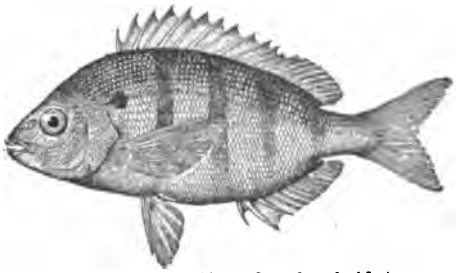
Captain Sigsbee's protractor is simpler and perhaps slightly slower in operation for some problems, but it is more easily handled, less likely to be injured and made useless on board ship, and is larger and more accurate. It consists of a large sheet of heavy smooth paper or thin cardboard upon which the hemisphere is stereographically projected. The points of departure and arrival are marked upon this as in the spherograph. In addition, upon a sheet of tracing paper, laid over the projection, you mark the centre, the point of departure, and the point of arrival. Turn the paper (keeping the centre always over the lower one) until the point of departure falls on the pole. The meridian which passes through the point of arrival is the great circle. Trace such portion as you wish, turn the paper back to the first position, and pick up the latitude and longitude of as many points as you want. Captain Sigsbee's protractor readily lends itself to the graphical solution of a very large number of astronomical problems.

SAIL-LIZARD. A large Oriental lizard (*Lophurus Amboinensis*) allied to the frilled lizard (q.v.), sometimes a yard long, with a very compressed olive-green body and tail, the latter surmounted for half its length by a high, serrate crest, supported by spines from the vertebræ. It is found from Java to the Philippines, dwells in

THE SAIL-LIZARD.

the jungle near streams, eats almost everything, and when frightened rushes into the water and endeavors to conceal itself on the bottom, where it can readily be taken by a net. Its flesh is sought for food.

SAILOR'S CHOICE. A common and highly valued food-fish (*Orthopristis chrysopterus*) along the sandy southeastern coast of the United States, belonging to the family of grunters



SAILOR'S CHOICE (*Lagodon rhomboides*).

(Hæmulidæ), called 'pigfishes' in this genus. The form is ovate-elliptical, and the length is 12 to 15 inches. The same name is given to several allied fishes, and especially to a small sparoid, or porgy (*Lagodon rhomboides*), also called 'pinfish,' a beautiful silvery-blue and gold fish of the Gulf Coast.

SAIN'FOIN (Fr. *sain-fon*, OF. also *sainct foin*, *saintfoin*, from *sain*, from Lat. *sanctus*, holy, less probably from Lat. *sanus*, sound + *foin*, from Lat. *fœnum*, hay), or ESPARSETTE (*Onobrychis viciæfolia*). A perennial pink-flowered leguminous plant, native to the temperate parts of Europe and Western Asia, and widely cultivated in Europe for pasturage and hay, but little in the United States. The plant grows to from 1 to 2

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feet high and has rather long pinnate leaves. The fruit consists of short single-seeded pods. It prefers a light, dry, calcareous soil, with a permeable, well-drained subsoil. It is often grown on soils too dry or too barren for clover. The culture of sainfoin is similar to that of alfalfa. Usually, however, only one cutting is made a year. From 1½ to 2½ tons of hay per acre are obtained, and the yield of seed ranges from 10 to 25 bushels. It does not endure close pasturing.

SAINT (OF. *saint, seint, sainct,* Fr. *saint,* from Lat. *sanctus,* holy, from *sancire,* to hallow; connected with Skt. *sañj,* to adhere). A name applied in the New Testament to the members of the Christian community generally, but early restricted in ecclesiastical usage to men and women of special eminence for personal holiness. The earliest class of saints to receive distinct recognition was naturally that of the martyrs (q.v.). The name of confessors was originally applied to those who had exhibited signal courage and constancy in professing the faith, without the final crown of martyrdom, but later was used of male saints in general who were not martyrs. Women are honored either as virgins, matrons, or widows. For the methods by which the title of saint has been conferred in early and in modern times, see CANONIZATION.

In the history of religious controversy there has been much discussion as to the status of the departed saints and their relation to the Church on earth. That there is some practical relation is contended as a logical sequence from the article of the Apostles' Creed which declares belief in 'the communion of saints;' and in like manner it is not often disputed that the saints, or those who have passed from earth into the presence of God, may offer their prayers to Him for the necessities of the Church militant. But while the Council of Trent lays down that it is a good and useful thing to invoke the saints on account of the benefits to be obtained from God by their aid, Protestants generally contend that such invocation is not only useless, since there is no certainty that the departed can hear our prayers, but positively unlawful, as trenching on the worship due to God and derogating from the mediatorial office of Christ. The first objection is met by the theory that the saints are in the immediate presence of God, and, gazing upon the Beatific Vision, "behold with open face as in a glass" all that God wills them to know of what is happening on earth. It is further asserted that there is an infinite difference between the worship paid to God as the Supreme Lord of the Universe and the address to the saints, which is the same in kind as that made without objection to venerated friends on earth. The last objection is answered by emphasizing the belief that the prayers of the saints gain their efficacy only by virtue of their union with the all-prevailing mediation of Christ. For the veneration paid to images and relics of the saints, see IMAGE-WORSHIP; RELICS.

BIBLIOGRAPHY. The most extensive as well as most scholarly is the collection by the Bollandists (q.v.), *Acta Sanctorum* (q.v.). Familiar to all English students is Alban Butler, *Lives of the Fathers, Martyrs, and Other Saints* (original edition, London, 1756-59; n. e. ib., 1896); *Lives of Saints and Servants of God* (edited by F. W. Faber, ib., 1843-44); Jameson, *Sacred and Legendary Art* (ib., 1848); id., *Legends of the Monastic Orders* (ib., 1850); Baring-Gould, *Lives of the Saints* (ib., 1872-92, new ed., ib., 1897-98); Gibson, *Short Lives of Saints for Every Day in the Year* (ib., 1896-97). For British and Irish saints particularly, consult: *Lives of the English Saints* (written by various hands, at the suggestion of John Henry Newman, ib., 1844-45; new ed., 1900 et seq.); Fleming, *A Complete Calendar of the English Saints and Martyrs for Every Day of the Year* (ib., 1902).

SAINT-ACHEUL, sän'tȧ'shēl'. A celebrated archæological site in the Somme Valley, Northern France. It gives name to the so-called Acheulean epoch in French archæology, following the Chelléan, the oldest in their Paleolithic period. It was characterized by great cold and the fauna is a transition toward that of the more temperate climate that followed.

SAINT-AFFRIQUE, sän'tȧf'frēk'. A town of the Department of Aveyron, France, on the Dourdon River, 37 miles east of Albi (Map: France, J 8). It is situated in a beautiful valley, between two mountains, and is surrounded by meadows, orchards, and vineyards. The streets are broad, but the houses are mostly old and mean. The town has woolen and cotton factories and tanneries, and a lively trade in wool, and is celebrated for Roquefort cheese, made from ewe's milk, chiefly in the mountain pastures around the neighboring village of Roquefort. The town successfully resisted the Prince de Condé in 1628. Population, about 5000.

SAINT ALBANS. A municipal borough in Hertfordshire, England, situated on a picturesque hill, 21 miles northwest of London. It is close to the site of *Verulamium,* the most important town in the south of England during the Roman period. King Offa II. of Mercia, in 795, founded an abbey in memory of Saint Alban, a Roman soldier and the proto-martyr of England, who died at the end of the third or the beginning of the fourth century. The town grew up about the abbey, which became the most important in England. During the Wars of the Roses the place was the scene of two battles; the first was in 1455, when the Lancastrians were defeated and Henry VI. was made a captive; the second in 1461, when the Yorkists were defeated. (See ROSES, WARS OF THE.) In 1877 Saint Albans became a bishop's see. The abbey is built, in part, of Roman bricks from Verulamium. The abbey church is cruciform and one of the largest in England. Its length is 550 feet, its breadth 175 feet, and its Norman tower is 145 feet high. Its earliest portions date from about 1080. The church underwent, in 1875, an extensive restoration. The gate, which is now a school, is the only extant portion of the other monastic buildings. In Saint Michael's Church there is a monument to Lord Bacon, who was Baron Verulam and Viscount Saint Albans. The population, in 1891, was 12,895; in 1901, 16,000, many of whom were employed in straw-plaiting and the manufacture of silk goods. The various annals and chronicles of Saint Albans are published in the Rolls Series, in 21 volumes. See, especially, Matthew of Paris and Roger of Wendover.

SAINT ALBANS. A city and the county-seat of Franklin County, Vt., 45 miles northwest of Montpelier; on the Central Vermont Railroad

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(Map: Vermont, B 2). It is attractively situated at an elevation of 400 feet, about two miles distant from Lake Champlain. Near by are the Aldis and Bellevue Hills, which afford extended views of the Green Mountains, Lake Champlain, and the Adirondacks. The city has a public library, the Warner Home for the Destitute, a hospital, and the Villa Barlow Convent. Saint Albans is noted as the centre of large dairying interests, and has a large creamery, several butter and cheese making establishments, and manufactories of iron and steel bridge work, iron roofing, and other iron products. Shops of the Central Vermont Railroad also are here. Population, in 1900, 6239.

Saint Albans was incorporated as a village in 1859, and was chartered as a city in 1897. It was a rendezvous of insurrectionist leaders during the Canadian troubles of 1837-38. On October 19, 1864, it was raided by Confederates from Canada, who seized more than $200,000 deposited in the local banks. In 1866 a party of Fenians started from Saint Albans to attack Canada, and later a force of United States troops under General Meade was stationed here to prevent further acts of hostility against Great Britain. Consult *Vermont Historical Gazetteer* (Burlington, 1867-82).

SAINT ALEXANDER NEVSKI, nĕf'skē. A Russian military order founded by Peter the Great in 1722. It was first conferred by Catharine I. in 1725. Only those of the rank of major-general are eligible for the distinction. The decoration is an eight-pointed red cross with double eagles in the angles, and in the centre an image of the saint on horseback, armed.

SAINT-AMAND, săn'tȧ'măn'. A town in the Department of Nord, France, 7 miles north by west of Valenciennes, at the confluence of the Elnon and Scarpe rivers (Map: France, K 1). It is noted for its mineral springs and baths. The town hall is the most prominent structure and affords a magnificent view of the surrounding country. The town is important for its manufacture of iron and steel. Population, in 1901, 13,705.

SAINT-AMAND, IMBERT DE. See IMBERT DE SAINT-AMAND.

SAINT-AMAND-MONT-ROND, -môn-rôn. The capital of an arrondissement in the Department of Cher, France, 27 miles north by west of Montluçon, on the Cher River (Map: France, J 5). In the vicinity are interesting ruins of an old Roman city. The town is also noted as the birthplace of the great Condé. It played an important part in the Hundred Years' War. Population, in 1901, 8326.

SAINT-AMANT, sĕn'tȧ'măn', ANTOINE GIRARD, Sieur de (1594-1661). A French poet, born probably near Rouen. Gautier calls him the creator, with Scarron and Théophile de Viau, of burlesque poetry in France. The most important of his poems are: *Moïse sauvé des eaux*, which contains some beautiful descriptive writing; *Solitude*, which Boileau calls his best work; and *Albion*, a curious picture of English manners. He published his *Œuvres poétiques*, in 4 parts (1629, 1631, 1643, 1649), and a *Dernier recueil* in 1658. Consult Gautier, *Les grotesques* (Paris, 1844).

SAINT AN'DREWS. A royal burgh, seaport, and watering place in Fifeshire, Scotland, on Saint Andrews Bay, 15 miles southeast of Dundee (Map: Scotland, F 3). It has two small harbors, and is one of the most fashionable of Scotch summer resorts, and its fine golf links stretch along the shore to the north of the town for two miles. Saint Andrews has been noted as an educational centre since 1120. (See SAINT ANDREWS, UNIVERSITY OF.) The manufacture of golf clubs and balls is the chief industry, Saint Andrews being the headquarters of golfing in Scotland. Fishing gives considerable employment, and coal is mined in the neighborhood. There are ruins of the cathedral commenced in 1160 and destroyed in 1559, of the castle dating from 1200, and of a Dominican monastery founded in 1274. Population, in 1901, 7621. Consult the monographs by Lang (London, 1893) and Boyd (ib., 1892; another vol., 1896).

SAINT ANDREWS, UNIVERSITY OF. The oldest Scotch university. It was founded in 1411 by Bishop Henry Wardlaw and confirmed by a bull of Pope Benedict XIII. It was modeled in most respects after the University of Paris (q.v.), and from the very beginning received the encouragement of the Scottish kings. By the middle of the sixteenth century there existed already three colleges: Saint Salvator, Saint Leonards, and Saint Mary, established in 1450, 1512, and 1537, respectively. They were at first devoted mainly to theology and philosophy, and although originally intended to combat heresy, they became the strongholds of Protestantism, particularly Saint Leonards. In 1579 the colleges were reorganized, Saint Salvator and Saint Leonards assuming the instruction of philosophy, law, and medicine, while theology was taught at Saint Mary's. The secular colleges were united in 1747. University College, founded by Dr. John Baxter and Miss Baxter in 1880, at Dundee, became affiliated with Saint Andrews in 1890. The university library, founded in 1456, contains over 115,000 volumes and manuscripts. The university's attendance in 1902 was 264.

SAINT ANDREW'S CROSS. A cross with beams forming the letter X, so named because Saint Andrew is said to have suffered on such a cross. Since it forms the initial of the Greek word for Christ, it was held in great honor. It is also called Burgundian cross, because it appeared in the Burgundian arms.

SAINT ANN, ORDER OF. A Russian order founded in 1735 by Duke Charles Frederick of Holstein-Gottorp in memory of his wife, Anna Petrovna. In 1797 it was made a Russian order of merit, and its single class was divided into three, to which two classes, for military candidates, were subsequently added. The decoration is a red cross bearing the image of Saint Ann, and is worn by the first class in connection with an eight-pointed star with the Imperial crown and the device, "Amantibus Justitiam, Pietatem, Fidem." The first class confers hereditary nobility.

SAINT ANTHONY, FALLS OF. See MINNEAPOLIS.

SAINT ANTHONY'S FIRE. See ERYSIPELAS.

SAINT-ARNAUD, săn'tȧr'nô', JACQUES LEROY DE (1796-1854). A French marshal, born

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in Paris. He helped suppress the abortive rising in the Vendée in 1832, and afterwards was sent to Africa. He defeated and captured the Algerian chief Bou-Maza in 1847 and was rewarded with the rank of brigadier-general. Saint-Arnaud was in Paris at the Revolution of 1848 and fought against the rioters at the head of a brigade. In 1851, after a successful campaign against the Kabyles, he was made a general of division, recalled to France, and put in command of the Second Division of the Army of Paris. On October 26, 1851, he was appointed War Minister, and was one of the chief agents of Napoleon in the coup d'état of December 2, 1851. A year later he was made a marshal of France and grand equerry to the Emperor. On the outbreak of the war in the Crimea Saint-Arnaud was put in command of the French forces. Soon after Saint-Arnaud succumbed to the hardships of the campaign, dying on board a French war vessel. His *Lettres* (2 vols., Paris, 1855) are autobiographical in nature.

SAINT ASAPH, sānt ăz'af. A city, standing on a small hill between the rivers Clwyd and Elwy, in the northwest of Flintshire, Wales (Map: Wales, C 3). Its trade is agricultural. The chief building is the cathedral, a cruciform structure, dating from 1284 on the site of a wooden structure founded before 596. Population, in 1901, 16,372. Consult Walcott, *Memorials of Saint Asaph* (London, 1865).

SAINT AUGUSTINE, ą'gŭs-tēn. A city and the county-seat of Saint John County, Fla., 32 miles south by east of Jacksonville; on Matanzas Bay, and on the Florida East Coast Railroad (Map: Florida, G 2). The oldest city in the United States, Saint Augustine is especially attractive with its narrow streets, picturesque old houses, and interesting remains. The vicinity is one of remarkable beauty owing to its semi-tropical vegetation. In the northern part of the city are ruins of the old wall erected by the early settlers as a protection against Indian incursions. Here, too, is the ancient fort of San Marco (now Fort Marion), begun about 1656 and finished a century later. It covers four acres. From this point southward extends the sea wall, constructed by the Federal Government —a popular promenade. An old Spanish convent occupied the present site of Saint Francis barracks at the southern extremity of the wall, its ruins having been utilized in the building of the modern structure. Near the barracks is the Alicia Hospital. The old Governor's palace, on the Plaza de la Constitución, in the central part of the city, has been rebuilt and now serves as a United States custom house and post-office. The cathedral dates from 1793. Other features are the municipal buildings, the Public Library, State Institute for the Deaf and Dumb, the Museum of the Institute of Natural Science, and Saint Joseph's Academy. Saint Augustine is of some importance as the centre of large fruit-growing interests, but is best known as a winter and health resort, being noted for its mild uniform climate. The mean annual temperature is 70° and the winter average 53°. There are several large hotels, among which is the Ponce de Leon, erected at a cost of $3,000,000. Across the bay from Saint Augustine is Anastasia Island, with a lighthouse and quarries of coquina, a shelly formation which has been used since the Spanish régime for building and paving purposes throughout the city. The government is vested in a mayor, chosen biennially, and a council. The water-works are owned and operated by the municipality. Population, in 1890, 4742; in 1900, 4272.

In 1513 Ponce de Leon, in search of the 'Fountain of Youth,' seems to have visited the site of Saint Augustine. Half a century later, in 1564, a company of French Huguenots passed here and settled a few miles to the north, on the Saint John's River. Don Pedro Menendez de Aviles, sent by Philip II. of Spain to expel the intruders, stopped here, August 28, 1565, Saint Augustine's Day, and erected a fort. After butchering the French (September 20th) at the Saint Johns he returned and established a settlement—the earliest within the present limits of the United States. Saint Augustine was burned by Sir Francis Drake in 1586 and sacked by the piratical Captain Davis in 1665. Throughout its early history ill feeling between the Spaniards and the English colonists to the north was chronic. In 1681 a force from Saint Augustine attacked the English settlements at Port Royal. Governor Moore of South Carolina made unsuccessful attacks on Saint Augustine in 1702 and 1704, burning the greater part of the town on the former occasion; and in 1743 General Oglethorpe, having been ordered away from Georgia by the Spanish, marched to Saint Augustine and besieged it unsuccessfully for thirty-eight days. In 1763 it passed with the rest of Florida into English hands and was used as a military station during the Revolution; but it became Spanish again in 1783. In 1821 it was transferred to the United States, in pursuance of the treaty of 1819. During the Civil War it was twice captured by Union armies. Consult: Fairbanks, *The History and Antiquities of Saint Augustine* (New York, 1858); id., *The Spaniards in Florida* (Jacksonville, 1868); Reynolds, *Old Saint Augustine* (Saint Augustine, 1885); and a sketch in Powell, *Historic Towns of the Southern States* (New York, 1900).

SAINT BARTHOL'OMEW. A small island of the Lesser Antilles belonging to the French colony of Guadeloupe, and situated near the northern end of the Leeward group 130 miles northwest of Guadeloupe (Map: West Indies, Q 6). Area, 8 square miles. It is about 1000 feet high, arid and devoid of forest, but produces some sugar, cotton, and cacao. Population, about 3000. The island was colonized by the French in 1648, bought by Sweden in 1785, and bought back by France in 1877.

SAINT BARTHOLOMEW, MASSACRE OF. See BARTHOLOMEW'S, MASSACRE OF SAINT.

SAINT BER'NARD, *Fr. pron.* săn bĕr'när', GREAT. A mountain pass in the Alps (q.v.) east of Mont Blanc, 8110 feet above the sea, with a carriage road connecting the valleys of the Dora Baltea and the Rhone (Map: Italy, B 2). The famous hospice or monastery of Saint Bernard, 17 miles from Aosta, in Italy, and 30 miles from Martigny, Switzerland, is almost at the summit of the pass beside a little lake which even in summer often freezes over. The hospice entertains yearly from 20,000 to 25,000 guests, who contribute only a small part of the $6000 to $8000 required to maintain the establishment.

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This monastery was founded in 962 by Saint Bernard de Menthon. It is now occupied by twenty Augustine monks with seven assistants. It is their special mission with the aid of their famous Saint Bernard dogs to rescue travelers who may be lost in the snow. In the hospice are engravings and pictures given by grateful travelers, a collection of coins, and numerous antiquities found in the vicinity—among them fragments of brass tablets offered to Jupiter Pœninus by pious Romans after escape from danger. From Jupiter Pœninus, who had here at one time a temple dedicated to him, the range of mountains is called the Pennine Alps, the mountain itself by the Italians, Monte Giove, and, locally, Mont Joux. This pass was much used by the Romans, particularly after the foundation of Aosta (q.v.), was improved by Constantine, traversed by the Lombards, by Charlemagne's uncle, Bernard, by Frederick Barbarossa, and by large bodies of French and Austrian soldiers during the campaigns of 1798, 1799, and 1800.

LITTLE SAINT BERNARD is a pass 7170 feet above the sea southwest of Mont Blanc, connecting the valleys of the Dora Baltea and the Isère.

SAINT BERNARD DOG. The largest of domestic dogs, often nearly three feet high at the shoulder and 150 pounds in weight. The race was developed from an unknown origin, at the Hospice of Saint Bernard, in the Alpine pass of that name, whose monks have maintained the breed through centuries for the purpose of giving aid to belated travelers, or rescuing those lost in snow-storms. They are also used to test the practicability of a snow-covered track, or the safety of an ice-bridge. Their capacity for tracking and their keenness of nose equal that of the best bloodhound. They are very hardy dogs, yet in the middle period of the nineteenth century they were nearly exterminated, once by a pest that left but one, and once by an avalanche, which carried away all but three of the monks' dogs. Excellent dogs for similar use have been bred and trained on the Saint Gothard, Simplon, Grimsel, and Furka passes, and in other Alpine hospices. Two varieties of Saint Bernards are recognized—the smooth-coated and the rough-coated. The shorter-haired dog shows better its true power and shape. The standard of the breed calls for a tall, erect figure, strong, muscular, and bony in every part; a powerful and imposing head, with a wide massive skull, and an intelligent expression. The supraorbital ridges are strongly developed, and form nearly a right angle with the horizontal axis of the head. A furrow runs up the centre of the forehead, between the supraorbital arches. The skin on the forehead is wrinkled, but not deeply. The chops of the upper jaw are strongly developed, like those of the bloodhound, but turn with a graceful curve into those of the lower edge, and are slightly overhanging. The nostrils are dilated and black; the ears lightly set on, and close at the base, and the back edge standing away when the dog is listening; the eyes set more to the side than to the front, the lids showing a slight haw. The feet are broad, and the toes strong, with a single or double dew-claw, giving an extended surface to the foot when on the snow. The coat is very dense, lying smooth, but in the rough-haired is considerably long, and flat to slightly wavy, and the tail is bushier than in the smooth-coated variety. The color may be black, red, or white in well-defined patches. Consult works cited under DOG; and see PLATE OF DOGS.

SAINT-BRIEUC, săn brē'ē'. The capital of the Department of Côtes-du-Nord, France, 63 miles northwest of Rennes, at the mouth of the Gouet River (Map: France, D 3). Its port, Le Légué, is one mile distant to the north on the English Channel. The town has an attractive situation, and is of considerable interest by reason of its antiquity. It has a cathedral dating from the thirteenth century, and recently restored, the Church of Notre Dame d'Espérance, also a thirteenth-century structure, and the Church of Saint Michel, a modern edifice. The town carries on a large coastwise trade in farm and garden produce and fish, and is largely interested in iron and steel manufactures. A monastery was established here in the latter part of the fifth century by Saint Brieuc, a Welsh missionary. Saint-Brieuc was the scene of much fighting during the Reign of Terror. Population, in 1901, 22,198.

SAINT CATH'ARINE, ORDER OF. A Russian order instituted in 1714 by Peter the Great, and originally intended as a special distinction for his consort Catharine, in recognition of her services in the Turkish campaign of 1711. The membership was subsequently extended to include all the princesses of the Imperial house and women of the nobility. The decoration, a diamond cross, has an oval medallion with an image of Saint Catharine holding a cross, on which are the letters D. S. F. R. (*Domine, Salvum Fac Regem*).

SAINT CATHARINES. The capital of Lincoln County, Ontario, Canada; situated on the Welland Canal and the Grand Trunk, the Welland, and the Niagara Central railroads; 12 miles northwest of Niagara Falls (Map: Ontario, D 4). The city has manufactories of machinery and agricultural implements. The surrounding country is picturesque and productive. The well-known mineral well of Saint Catharines supplies on an average 130,000 gallons a day. Saint Catharines has been called the Saratoga of British America. There are gas and electric lights, gravity system of water-works, good sewerage system, and superior educational institutions, including the Bishop Ridley College, an Anglican establishment. Population, in 1891, 9170; in 1901, 9946.

SAINT CATHARINE'S COLLEGE. A college founded at Cambridge, England, by Robert Wodelarke, or Woodlark, Provost of King's College and chancellor of the university, in 1473 (charter in 1475), for a master and three fellows. It is, and, save in the seventeenth century, has always been, one of the smaller Cambridge colleges. There were, in 1902, a master, 6 fellows, and 26 scholars, besides sizars. Among the more distinguished members of the college may be mentioned Archbishop Sandys, Dr. Addenbrooke, founder of the hospital in Cambridge, and the naturalist John Ray.

SAINT-CHAMOND, săn'shä'môn'. A town in the Department of Loire, France, situated at the confluence of the Gier and the Ban, 8 miles by rail northeast of Saint Etienne (Map: France, L 6). It is a flourishing, well-built town, and is the centre of a district extensively engaged in the

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manufacture of laces and ribbons. There are also dye works, naval and railway workshops. There are coal mines in the vicinity. Population, in 1901, 15,469.

SAINT CHARLES. A city and the county-seat of Saint Charles County, Mo., 20 miles northwest of Saint Louis; on the Missouri River, and on the Wabash and the Missouri, Kansas and Texas railroads (Map: Missouri, F 3). It is the seat of the Lindenwood Female College (Presbyterian), opened in 1830, Saint Charles Military College (Methodist Episcopal), founded in 1834, and the Sacred Heart Academy. The court house here is a fine structure, having cost $100,000. The centre of a rich agricultural section, Saint Charles has also important industrial interests. The car factory is one of the most extensive of its kind in the United States and there are also manufactories of cob pipes, flour, brick and tile, furniture, and beer. The leading articles of commerce include the manufactured products, tobacco, limestone, corn, and farm produce. The government, under the revised charter of 1899, is vested in a mayor, elected biennially, and a unicameral council. The city owns and operates the water works and electric light plant. Settled in 1769, Saint Charles was incorporated in 1849. Population, in 1890, 6161; in 1900, 7982.

SAINT CHARLES, Order of. An order of merit founded in 1858 by Charles III. of Monaco, on the model of the Legion of Honor. The decoration is a white enameled cross with a red border, surmounted by a crown and interwoven with a wreath of laurel and olive. The central red medallion bears two C's with the legend *Princeps et Patria.*

SAINT CHRISTOPHER, or Saint Kitts. One of the Leeward Islands, British West Indies, situated in 17° 18′ N. latitude and 62° 48′ W. longitude, and covering an area of 65 square miles (Map: West Indies, Q 6). It is traversed in the centre by a mountain range, of which the highest peak, the extinct volcano Mount Misery, is more than 4000 feet high. The climate is healthful; the chief products are sugar and rum. Coffee and cotton are also cultivated to some extent. Together with Nevis (q.v.) and the dependency of Anguila, Saint Christopher forms a division of the Leeward group. Population, in 1891, 30,876; in 1901, 29,782. Capital, Basse Terre. The island was discovered by Columbus in 1493 and settled by the English and French about 1623-25. It was ceded to Great Britain by the Treaty of Utrecht in 1713.

SAINT CLAIR. A borough in Schuylkill County, Pa., 3 miles north of Pottsville; on Mill Creek, and on the Pennsylvania and other railroads (Map: Pennsylvania, E 3). It is situated in a hilly region, containing extensive deposits of anthracite, the mining of which constitutes the leading industry. Miners' squibs and fuses and miners' caps are the principal manufactures. Population, in 1890, 3680; in 1900, 4638.

SAINT CLAIR, Lake. A lake belonging to the Great Lakes system, and situated between Lake Huron and Lake Erie, and between the State of Michigan and the Province of Ontario (Map: Michigan, L 6). It is 27 miles long and 25 miles wide, and has an area of 396 square miles. It receives the waters of Lake Huron through the Saint Clair River, and discharges into Lake Erie through the Detroit River. Its elevation above sea-level is 576 feet, being 6 feet lower than Lake Huron, and 3 feet higher than Lake Erie. Its greatest depth is 21 feet, and in the north, where it borders on the mud-flats of the Saint Clair delta, it is very shallow. Steamers drawing 20 feet, however, can pass between the two rivers.

SAINT CLAIR, Arthur (1734-1818). A Scotch-American soldier. He was born at Thurso, Caithness-shire, Scotland; was educated at the university of Edinburgh, joined the British army as an ensign, and in 1758 came to America with Admiral Boscawen. He served with distinction under Amherst at Louisburg, and under Wolfe at Quebec; resigned his commission in 1762, and in 1764 settled in Pennsylvania. He held various civil offices until the breaking out of the Revolution, when he joined the colonial army with the rank of colonel. For his gallant services at the battles of Three Rivers, Trenton, and Princeton, he was raised to the rank of major-general in 1777 and placed in command at Ticonderoga. He was forced to abandon that place to Burgoyne, and, although acquitted of blame by court-martial, lost his command. Remaining in the army as a volunteer, he again rose to important positions, distinguishing himself in the operations which ended with the surrender of Cornwallis. He was a member of the Continental Congress 1785-87, becoming its president in the latter year, and from 1783 to 1789 was president of the Pennsylvania State Society of the Cincinnati, giving its name to that city in 1790. In 1789 he was made the first Governor of the Northwest Territory, and in 1791, as commander-in-chief of the United States army, was sent on an expedition against the Miami Indians, which ended in the disastrous rout of his forces. A committee of investigation appointed by Congress exonerated him, but he resigned his command in May, 1792, and in 1802 Jefferson removed him from his Governorship. His last years were spent in poverty and obscurity. Consult: *A Narrative of the Manner in which the Campaign against the Indians in the year 1791 was conducted under the command of Major-General Saint Clair* (Philadelphia, 1812); Smith, *The Life and Public Services of Arthur Saint Clair* (Cincinnati, 1882).

SAINT CLAIR RIVER. The outlet of Lake Huron. It is 41 miles long, and flows south on the boundary between Michigan and Ontario, emptying into Lake Saint Clair (q.v.) through a fan-shaped delta of seven channels (Map: Michigan, L 6). The river itself is navigable, and one of the delta channels has been improved by canalizing a part of it and guarding it by embankments. It is being made available for vessels drawing 20 feet. In 1891 a tunnel was built under the river between Port Huron and Sarnia, measuring with its approaches 3851 yards, and connecting the Canadian Grand Trunk and the Chicago and Grand Trunk railways.

SAINT-CLAUDE, săn′klōd′. The capital of an arrondissement in the Department of Jura, France, at the confluence of the Bienne and Tacon, 19 miles northwest of Geneva (Map: France, M 5). It is an episcopal see, with a fourteenth-century cathedral, the former church of an important abbey, which was suppressed at the Revolution. The town has manufactures of toys,

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pipes, and snuff boxes, and is noted for its lapidary establishments. Population, in 1901, 10,499.

SAINT-CLOUD, klōō. A town of France, in the Department of Seine-et-Oise, situated on the declivity of a hill near the Seine, 5 miles west of Paris (Map: Paris and vicinity). Population, in 1901, 6205. Its famous and beautiful park contains about 1000 acres, is embellished by spacious allées and a large cascade and fountain, and commands a fine view over Paris. The town figures often in the wars of the Middle Ages. Henry III. was assassinated here in 1589, by the fanatical monk Jacques Clément. Saint-Cloud was long famous on account of its magnificent château, built by Mazarin, and embellished by successive dukes of Orleans, who possessed it till 1782, when it passed into the hands of Marie Antoinette. Here Bonaparte, in 1799, was named First Consul; and in this place Charles X. signed the ordinances which produced the Revolution of 1830. But during the siege of Paris, the château was set on fire and destroyed by the artillery.

SAINT CLOUD. A city and the county-seat of Stearns County, Minn., 65 miles northwest of Minneapolis; on the Mississippi River, and on the Northern Pacific and the Great Northern railroads (Map: Minnesota, D 5). It is the seat of a State Normal School and of the Minnesota State Reformatory. Saint Raphael's Hospital, the Catholic cathedral, the Public Library, and the Home for the Aged are other noteworthy features. Saint Cloud is the centre of a grain-growing and stock-raising region, but is best known for its large granite interests. Manufacturing is extensively carried on, excellent water power being derived from rapids of the Mississippi. There is considerable trade in iron and lumber products, brick, flour, and beer, which constitute the principal manufactures. The government is vested in a mayor, chosen annually, and a unicameral council. Settled in 1854, Saint Cloud was incorporated in 1868, and was chartered as a city in 1889. Population, in 1890, 7686; in 1900, 8663.

SAINT CROIX, kroi, or SCHOODIC. A river forming part of the boundary between Maine and New Brunswick (Map: Maine, J 5). It flows from the Schoodic or Grand Lakes in Maine 75 miles southeast into Passamaquoddy Bay. It is navigable to Calais, about 10 miles.

SAINT CROIX RIVER. A river forming part of the boundary between Minnesota and Wisconsin (Map: Wisconsin, A 3). It rises in the northwestern corner of the latter State and flows southwest for 200 miles, entering the Mississippi through a lake-like expansion, 20 miles below Saint Paul. It is navigable 54 miles to Saint Croix Falls, above which there are several picturesque falls.

SAINT-CYR, săn'sêr', LAURENT GOUVION, Marquis de (1764-1830). A marshal of France, born at Toul. In 1792 he volunteered in the Army of the Republic. He served under Custine, and having been promoted to the grade of general of division in 1793, took part in the campaigns on the Rhine and in Holland, whence in 1798 he was sent to Italy to succeed Masséna. There he quickly restored military discipline, and in 1800, after a brilliant campaign in Italy, he returned to Germany, became Moreau's lieutenant, and defeated Kray at Biberach. Napoleon sent him to Spain as Ambassador in 1801, and in 1803 made him commander of the army of occupation in Naples. In 1809 he lost the favor of Napoleon and resigned, but in 1812 he was given command of a corps in the army which invaded Russia, and, after his great victory at Polotzk, he was made marshal. He was captured at Dresden in 1813. During the Second Restoration, in 1815, he became Minister of War, and again in 1817, serving till 1819. His *Mémoires* were published at Paris (1821-31). Consult De Vernon, *Vie du maréchal Gouvion Saint-Cyr* (Paris, 1857).

SAINT-CYR, MAISON DE. A once famous school for girls, founded by Madame de Maintenon (q.v.) in 1686, for the education of the daughters of the poor nobility and the children of dead or disabled officers. In 1692 the school was converted into a convent. Fénelon's *De l'éducation des filles*, published in 1687, influenced considerably the educational ideas at Saint-Cyr. The establishment of this institution marks the beginning of the emancipation of women's education. Madame de Maintenon personally supervised the institution from 1686 to 1717, and sometimes even taught there. The notoriety the school attained on account of the successful performances of a number of plays under the direction of Racine and Boileau had a demoralizing effect on the discipline of the school and undoubtedly influenced the founder in changing her liberal policy. It ceased to exist in 1793, when it was converted into a military hospital.

SAINT-CYR-L'ÉCOLE, lā'kôl'. A village in the Department of Seine-et-Oise, France, 4 miles by rail west of Versailles. It derives its celebrity from the Ecole Spéciale Militaire de Saint-Cyr, which was transferred here in 1806 from Fontainebleau by Napoleon, and is the leading military training establishment in France, attended by from 700 to 800 pupils, and furnishing the army with 400 officers annually. Population, in 1901, 4253.

SAINT DA'VID'S. A city in Pembrokeshire, Wales, on the Allan, a mile from its mouth, on the northern side of Saint Bride's Bay (Map: Wales, A 5). It is noted for Saint Mary's College (founded by John of Gaunt), within a high embattled wall nearly a mile in circuit. The cathedral, founded in 1180, on the site of the Monastery of Saint David, and restored since 1846, contains a curious movable pulpit. The town has been the seat of a bishopric since 519. It was several times pillaged and burned by the Danes and others during the ninth and two following centuries; in the Middle Ages it was a large city—the great resort of pilgrims to Saint David's shrine. Population, in 1901, 5400.

SAINT-DENIS, săn'de-nē'. The capital of an arrondissement and a northern suburb of Paris, in the Metropolitan Department of Seine, France, 2 miles from the city walls (Map: Paris and vicinity). It is defended by a fort on the east and by ramparts on the north. The town is traversed by the Croud and Rouillon, and is well built, with clean, spacious streets. Its history centres around the Basilica of Saint-Denis, built in the seventh century as the church of an abbey by Dagobert I., on the site of the chapel raised above the grave of Saint-Denis, the

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first Bishop of Paris, about A.D. 275. Dagobert was buried in the church, which became the mausoleum of the kings of France. The edifice was rebuilt in the twelfth century. By decree of the National Convention of 1793, the abbey was ordered to be destroyed, the royal tombs were demolished, and the bodies removed. The building was much damaged, stripped of its roof, and for some time was used as a cattle market. Restored under Napoleon I., and succeeding governments, it regained and even surpassed its former splendor under the complete restoration effected by Viollet-le-Duc during the Third Empire, and is now considered one of the finest of Gothic monuments. The restored royal monuments, the high and other altars, the lofty nave lighted by thirty-seven handsomely blazoned windows, the elegant triforium, and the radiating choir chapel are among its chief features. Adjoining the church is the extensive national Maison d'Education de la Légion d'Honneur, founded by Napoleon I., for the free education of the daughters and other female relatives of officers of the Legion of Honor. There are cotton mills, dye works, bleacheries, chemical works, and flour mills. The yearly market, at which there is an annual sale of about 180,000 sheep, is one of the oldest in France, and lasts for a fortnight. Population, in 1901, 60,808.

SAINT-DENIS. The capital of the French island of Réunion (q.v.), situated on the northwestern coast (Map: Africa, K 7). It has an exposed roadstead and contains a museum, a theatre, and barracks. Population, in 1899, 32,850, chiefly French creoles.

SAINT-DIÉ, dyâ. An episcopal city and the capital of an arrondissement in the Department of Vosges, France, 31 miles southeast of Lunéville, on the Meurthe River (Map: France, N 3). It is attractively situated in the midst of picturesque mountain scenery, and, with the exception of the eastern portion, is regularly laid out. The cathedral, dating from the eleventh century, is a composite of Gothic and Romanesque. Other features of the city include an eighth-century Romanesque church, the Canons' House, dating from 1557, the seventeenth-century episcopal palace, the museum, public library, the monument to Jules Ferry, born at Saint-Dié, and the park, extending along the bank of the river. Saint-Dié has important lumber interests and is also engaged in weaving and the manufacture of hosiery, tiling, etc. A monastery was established here in the sixth century by Saint Deodatus, from whom the city derives its name. Population, in 1901, 21,481.

SAINT-DIZIER, dē'zyâ'. A town in the Department of Haute-Marne, 58 miles northeast of Troyes, on the Marne River, and on the Marne-et-Saône Canal (Map: France, L 3). It has a college, a museum, and a public library. Industrially the town ranks very high. It is especially noted for its extensive iron and steel manufactures, and large lumber interests. Shipbuilding is also a prominent industry. Population, in 1901, 14,601.

SAINTE-ALDEGONDE. sănt'âl'de-gŏnd', PHILIP VON MARNIX, Baron. A Flemish statesman. See MARNIX.

SAINTE ANNE DE BEAUPRÉ, *Fr. pron.* sănt ăn de bō'prā'. A celebrated pilgrim resort of Montmorency County, Quebec, Canada, at the confluence of the Sainte Anne River with the Saint Lawrence River, on the north bank (Map: Quebec, F 3). It is connected with Quebec, 21 miles to the southwest, by the Quebec, Montmorency and Charlevoix Railway. The Church of Sainte Anne is a fine building; it dates from 1876 and was created a basilica by Papal decree in 1887. It contains relics of Sainte Anne, which have reputed miraculous powers. The shrine is visited by thousands of pilgrims annually, the number on the saint's feast day, July 26, in 1898, amounting to 125,000. Sainte Anne was founded about 1620 by Breton mariners; the ancient church dating from 1658, rebuilt and restored in 1878, is an interesting edifice near the modern basilica. The picturesque Falls of Sainte Anne (130 feet high), the Falls of Saint Féréol, and the Sainte Anne Mountains (2685 feet high) are prominent features in the neighborhood. Population (estimated), 1000.

SAINTE-BEUVE, sănt'bēv', CHARLES AUGUSTIN (1804-69). A French critic and essayist. He was born at Boulogne-sur-Mer, December 23, 1804. He was educated at Boulogne and at the Collège Charlemagne in Paris, studied medicine (1824-27), and served in the Saint Louis Hospital (1828). Beginning in 1824, he contributed literary articles, the *Premiers lundis* of his collected *Works*, to the *Globe* newspaper, and in 1827 he came, through a review of Hugo's *Odes et ballades*, into close relations with that poet and the Cénacle (q.v.). As a justification of the Romantic movement he published in 1828 a *Tableau de la poésie française au XVIème siècle*, and in 1829 and 1830 two volumes of subtle and ingenious though rather morbid poetry, the *Vie et poésies de Joseph Delorme* and the *Consolations*. He contributed also, in 1830, to the Revue de Paris, the first of his famous literary *Causeries*. The Revolution of 1830 brought him under new influences. Religious questionings were fostered by intimacy with Lamennais and his unrest is witnessed by his solitary novel, *Volupté* (1834), and by his lectures on *Port-Royal*, delivered at Lausanne (1837) and expanded during the next twenty years into five volumes (1840-60), of which the first and second show sympathy with Jansenism and the latter three the objectivity of an unbiased critic. At Lausanne, under the cherished influence of Vinet, Sainte-Beuve wrote his last volume of verse, the *Pensées d'août*. Then a visit to Italy clarified his mind, and from 1840 he appears wholly master of himself, as a 'naturalist of minds.' An appointment as Keeper of the Mazarin Library (1840) secured him scholarly leisure, and for 8 years he contributed regularly literary studies to the *Revue des Deux Mondes*. In 1845 he was elected to the French Academy, and during the turmoil of 1848 he lectured at Liège on *Chateaubriand et son groupe littéraire* (1860). In 1849 he returned to Paris and began his series of Monday chats (*Causeries du lundi*) in the *Constitutionnel*. These are collected in 28 volumes, 15 of *Causeries du lundi* and 13 of *Nouveaux lundis*. Longer studies in the reviews are gathered under the titles *Critiques et portraits*, *Portraits contemporains*, and *Portraits de femmes*. When Napoleon became Emperor he made Sainte-Beuve professor of Latin poetry at the Collège de France, but the anti-Imperialist students

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hissed him, and he resigned. He was made Senator in 1865, and, although a partisan of Napoleon III., distinguished himself by his pleas for freedom of speech and of the press. He was in his last years an acute sufferer and lived much in retirement. Sainte-Beuve had vast knowledge, wonderful tact, and acute perception of what was vital and significant in his subjects. The mere bulk of his work (53 vols.) is imposing, and when we consider its precision, subtlety, and delicacy, the whole stands alone in the literature of criticism. A selection of the *Causeries* in English appeared as *English Portraits* (New York, 1875), and another as *Essays on Men and Women* (London, 1890). Consult: Sainte-Beuve, "Ma Biographie," in *Nouveaux lundis*, vol. xiii. (Paris, 1863-72); Haussonville, *Sainte-Beuve, sa vie, ses œuvres* (ib., 1875); Vattier, *Sainte-Beuve* (ib., 1892); Levallois, *Sainte-Beuve* (ib., 1872); Brunetière, *Evolution des genres*, vol. i. (Paris, 1889); id., *Manual of French Literature* (Eng. trans. London, 1898); Pons, *Sainte-Beuve et ses Inconnues* (Paris, 1879); Troubat, *Souvenirs du dernier secrétaire de Sainte-Beuve* (ib., 1890).

SAINTE CHAPELLE, sănt shâ'pĕl'. A chapel or oratory built to receive relics of peculiar sanctity. The name is, however, commonly used to designate in particular the 'Sainte Chapelle du palais' at Paris, erected 1242-47 within the precincts of the royal palace, to serve at once as the chapel royal and as a depository for the crown of thorns and fragments of the true cross, brought from Jerusalem by Louis IX., at whose expense it was built. The architect was the celebrated Pierre de Montreuil (see MONTREUIL) or de Montereau; and this, his master work, is justly regarded as one of the most consummate products of mediæval architecture. The extraordinary rapidity of its construction resulted in a remarkable unity of style not found in Gothic buildings whose erection extended over considerable periods of time. Its execution is marvelously refined and perfect. It consists of a lower or basement chapel, 24 feet high, and the main or upper chapel, preceded by a superb open porch, vaulted likewise in two stories. The upper or main floor was on the level of the main floor of the palace, with which the porch communicated. The length over all is 135 feet, with a height of 128 feet to the ridge of the roof, above which rises a slender (modern) spire. The upper chapel is internally 105 feet long, 33 feet wide, and 64 feet high to the ridge of the vault; it is without columns, and terminates in a polygonal apse, in which once stood the shrine of the relics. The superb vault is carried and abutted by a construction of buttresses, the space between which are wholly occupied by magnificent traceried windows 50 feet high, filled with the most gorgeous stained glass; the effect is extraordinary in its sumptuousness of color and boldness of design. The exterior is no less remarkable in exemplifying the perfection of French Gothic construction and carving in the middle of the thirteenth century. The rose window is of a later date. Other saintes chapelles were at Saint-Germain, Vincennes, and the Abbey of Saint-Germain-des-Prés. Consult: De-Cloux and Doury, *La Sainte Chapelle* (Paris, 1865); Viollet-le-Duc, *Dictionnaire raisonné de l'architecture*, s. v. "Chapelle," "Chapelles, Saintes" (ib., 1858-68).

SAINTE-CLAIRE DEVILLE, sănt'klâr'de-vêl', HENRI ETIENNE (1818-81). A French chemist, born at Saint Thomas, West Indies. He received his education in France. For several years he was instructor at Besançon; in 1851 he was appointed professor of chemistry at the Ecole Normale and subsequently also at the Sorbonne, in Paris. His chief work in theoretical chemistry consisted in a series of researches on the phenomena of what he termed *dissociation*, a peculiar and important class of physico-chemical reactions, the study of which has contributed greatly to our knowledge of the mechanism of reactions in general. By the use of a simple apparatus of his own invention, he demonstrated and succeeded in measuring the dissociation of carbonic acid gas, sulphur dioxide, and hydrochloric acid gas. See DISSOCIATION.

Deville founded two important industries, viz. the aluminum and the magnesium industries. In 1854 he rediscovered independently and showed how to apply on a large scale Wöhler's method by which metallic aluminum is isolated by decomposing its chloride with metallic potassium; instead of potassium Deville employed the cheaper metal sodium, in the industrial production of which he introduced highly valuable improvements. Ingots of aluminum were exhibited by him, for the first time, at the Paris Exposition of 1855. By applying Wöhler's principle to magnesium, he succeeded, jointly with Caron, in producing this metal, likewise, on a large industrial scale. His researches on the metallurgy of platinum, carried out in conjunction with Debray, have also proved of the highest importance. Deville wrote *De l'aluminium, ses propriétés, etc.* (1859); *Métallurgie du platine* (jointly with Debray; 2 vols., 1863), etc. Consult Gay, *Henri Sainte-Claire Deville, sa vie et ses travaux* (1889).

SAINTE CROIX, krwä. The largest of the Danish West India Islands. See SANTA CRUZ.

SAINTE CUNÉGONDE, *Fr. pron.* kụ'nâ'-gôNd'. A northwestern suburb of Montreal, Canada, constituting a city of Hochelaga County, Quebec. It is noted for its educational institutions and has some manufactures. Population, in 1891, 9291; in 1901, 10,912.

SAINT EDMUND HALL. The only remaining hall or hotel of Oxford University. It is said to have derived its name from Saint Edmund, Archbishop of Canterbury in the reign of Henry III., and to have been founded in 1226. At the dissolution of the monasteries, it came into the possession of Queen's College (1557), and since 1559 the perpetual right of nominating its principal has been vested in that society by an act of congregation. The foundation consists of a principal and a vice-principal. There are ten exhibitions attached to the hall for students designed for holy orders. The buildings, dating from the seventeenth century, adjoin those of Queen's College, and the undergraduates of Saint Edmund are admitted to lectures in Queen's.

SAINTE GENEVIEVE. A city and the county-seat of Sainte Genevieve County, Mo., 60 miles by water south-southeast of Saint Louis; on the Mississippi River (Map: Missouri, F 4). It is the shipping centre for a farming and stock-raising section, which also has deposits of building stone and copper. Flour and beer are the

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principal manufactures. Sainte Genevieve is one of the oldest towns in the Mississippi Valley, having been settled about 1735. Population, in 1890, 1586; in 1900, 1707.

SAINT ELIAS, MOUNT. One of the highest peaks of North America, being exceeded only by Mount McKinley, the neighboring Mount Logan, and by Mount Orizaba in Mexico. It is situated on the narrowest portion of Alaska Territory, between the Canadian boundary and the Pacific Ocean, in latitude 60° 17′ N. and longitude 140° 55′ W. (Map: Alaska, G 3). Its height is over 18,000 feet. The southern slope is covered with glaciers extending to the seashore, and is exceedingly steep, almost precipitous. The northern or landward slope is more accessible. In 1897 Prince Luigi of Savoy successfully made the ascent to the summit. The foothills are covered with forests to a height of 2000 feet, but the mountain itself is almost destitute of vegetation, and covered with ice and snow. It is not of volcanic origin, as has been supposed, but is formed by the faulting of a portion of the earth's crust.

SAINT ELIZABETH, ORDER OF. A Bavarian order of benevolence for women, founded in 1766 for noble Catholics. The membership is unrestricted, but candidates must show noble descent for four generations.

SAINTE-MARGUERITE, mär′ge-rēt′. An island of the Mediterranean. See LÉRINS, ISLES DE.

SAINTE-MARIE-AUX-MINES, mä′rē′ō′-mēn′. The French name of Markirch (q.v.).

SAINTES, sănt. The capital of an arrondissement in the Department of Charente-Inférieure, France, 27 miles southeast of Rochefort, on the Charente River (Map: France, F 6). It is noted for its many interesting remains of the period of Roman occupation. Among these the Amphitheatre and the Arch of Germanicus are the most prominent. The Church of Saint Eutropius, originally dating from the sixth century, was remodeled in the sixteenth. It has a large, handsomely embellished crypt. Other important features of the town are the Church of Notre Dame, dating from the eleventh century; the court house; the town hall, with its library; and the hospital. Iron and copper working and the manufacture of farm implements are the leading industries. Population, in 1901, 18,219.

Saintes, the ancient *Mediolanum*, was the chief city of the Santones before it passed into the hands of the Romans. The town was the capital of the old Province of Saintonge.

SAINT-ETIENNE, ā′tā′ĕn′. The capital of the Department of Loire, France, and one of the most important industrial centres of Southern France. It is situated on the Furens, a tributary of the Loire, 36 miles southwest of Lyons by rail (Map: France, L 6). It is essentially a manufacturing city and, with the exception of the Church of Sainte Marie, the palace of justice, and the town hall, contains no buildings of architectural merit. Owing to its situation in one of the richest coal regions of Southern France and the abundance of water power furnished by the Furens, Saint-Etienne has developed very rapidly and its industrial importance is constantly increasing. The chief manufactures are firearms, and the national factory alone employs in the neighborhood of 10,000 persons. Outside of firearms, small iron and steel products, and agricultural implements, Saint-Etienne is famous for its extensive ribbon factories, the product of which is exported all over the world and is regarded as the best of its kind. The coal mines in the vicinity of the city have an annual output of over 4,000,000 tons. Of educational establishments, Saint-Etienne has a fine school of mining, a lycée, a college, and a Palais des Arts containing a number of museums, among which the industrial museum, with its numerous samples of local manufactures, is the most interesting. The population of Saint-Etienne has kept pace with its industrial growth, and increased from 33,000 in 1830 to 92,250 in 1861, and to 139,350 in 1901.

SAINT EUSTACHE ISLAND. An island of the West Indies. See EUSTATIUS ISLAND.

SAINT-ÉVREMOND, săn′tā′vre-môn′, CHARLES DE MARGUETEL DE SAINT-DENIS, Seigneur de (1613-1703). A French critic and philosophical writer. He was born at Saint-Denis-le-Guast, was trained by the Jesuits, entered the army and served in Italy (1629) and Germany for the greater part of the Thirty Years' War. He was a friend of Condé and in philosophy a follower of Gassendi. Though a stanch Royalist, he was exiled, without sufficient apparent cause, after the fall of Fouquet (1661). He went to Holland and then to England, where Charles II. pensioned him. On the fall of James II. he declined an invitation to return to France, and made his home with the niece of Mazarin, Hortense Mancini. He died in London and was buried in Westminster Abbey. As a refined philosophical essayist and a master of French prose, worthy to be classed with Pascal and Voltaire, he has received, especially in the last century, increasing attention and appreciation. In his lifetime he published nothing, but circulated his work in manuscript, whence some of it found a side door to publicity in 1668. His *Œuvres* appeared in three volumes (London, 1705), with a memoir by Des Maizeaux, and have often been reëdited, perhaps best by Giraud (Paris, 1865). Consult: Gidel, *Etude sur Saint-Evremond* (ib., 1866); Marlet, *Saint-Evremond, étude historique, etc.* (ib., 1870); Sainte-Beuve, *Causeries*, vol. iv. (ib., 1857-62).

SAINT FERDINAND, ORDER OF. (1) A Sicilian order of merit, founded in 1800 by King Ferdinand IV., and abolished in 1861. (2) A Spanish military order, with five classes, founded by the Cortes in 1811 and renewed in 1815 by King Ferdinand VII. Connected with it are pensions ranging from 400 to 40,000 reals. The decoration for the first and third classes is a white eight-pointed cross, bearing the image of Saint Ferdinand, surrounded by a blue band and the inscription *Al merito militar*. The second and fourth classes bear the same decoration resting on a laurel wreath.

SAINT-FLOUR, flōōr. The capital of an arrondissement in the Department of Cantal, France, 52 miles south of Clermont-Ferrand (Map: France, K 6). The town is built at an altitude of 2895 feet above sea level, on the edge of a plateau which rises sheer several hundred feet from a valley of the Cantal mountains.

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It has manufactures of pottery and coarse cloth. Population, in 1901, 5634.

SAINT FRAN'CIS RIVER. A tributary of the Mississippi. It rises near Iron Mountain, in southeastern Missouri, and flows south into Arkansas, forming for a short distance the boundary between the two States (Map: Arkansas, E 2). It empties into the Mississippi near Helena after a course of 450 miles. The greater part of its course winds through a low, swampy country interlaced with bayous, and for about 70 miles the river expands into a lake from 1 to 5 miles wide. This serves as an important reservoir during the floods of the Mississippi. The river is navigable for 150 miles.

SAINT FRANCIS XAVIER, zăv'ĭ-ĕr, COLLEGE OF. A Roman Catholic institution in the city of New York, founded in 1847 and endowed with collegiate powers in 1861. It is conducted by the Fathers of the Society of Jesus, and is intended for day scholars only. The college comprises three departments—the college proper, the graduate school, and the high school department—and confers the degrees of B. A. and M. A. In 1902 it had a library of about 100,000 volumes, 32 instructors, and 650 students in all departments.

SAINT GALL, *Fr. pron.* săn gâl (Ger. *Sankt Gallen*). A northeastern canton of Switzerland, bounded on the north by the Canton of Thurgau and Lake Constance, on the east by the Rhine, which separates it from Vorarlberg, Liechtenstein, and Grisons, on the south by Grisons and Glarus, and on the west by Schwyz and Zurich (Map: Switzerland, D 1). It incloses entirely the Canton of Appenzell and covers an area of 779 square miles. The north is hilly, while the south belongs to the region of the Western Alps, the Ringelspitz, near the southern frontier, reaching an altitude of over 10,500 feet. The canton belongs to the basin of the Rhine and its principal river is the Thur.

The climate varies in accordance with the conformation of the surface and is somewhat raw in the mountainous parts. Considering its uneven surface, Saint Gall is a very productive region, over 65 per cent. of its total area being under tillage, gardens, and meadows. Still the domestic supply of agricultural products is insufficient to meet the demand, owing to the density of the population. The grape and other fruits are cultivated in the valley of the Rhine and in the northern part. Saint Gall is among the industrial cantons of Switzerland and produces chiefly cotton goods and embroideries.

The Constitution of the canton provides for a legislative assembly (*Grosser Rat*), the members of which are elected by the communes at the rate of one member for every 1500 inhabitants; and an executive council of seven members elected by the people. The referendum is in force. The population of the canton was 228,174 in 1888, and 250,285 in 1900. Over one-half of the inhabitants are Roman Catholics, and the German language is spoken by a large majority of the population. For history, see SAINT GALL, the capital of the canton.

SAINT GALL. The capital of the Canton of Saint Gall and one of the most important manufacturing centres of Switzerland, situated at an altitude of nearly 2000 feet, about 50 miles east of Zurich and about 12 miles from Lake Constance (Map: Switzerland, D 1). It consists of the irregular old town on a hill and the new quarters in the valley of the Steinach. The Roman Catholic cathedral, formerly an abbey church, is a rococo building dating chiefly from the middle of the eighteenth century. The Benedictine abbey was founded early in the seventh century by Saint Gallus, an Irish monk, and was one of the most famous seats of learning in Europe during the ninth and tenth centuries. The eighteenth-century building is now used by the cantonal Government. Its celebrated library contains about 30,000 volumes, including nearly 1600 incunabula and a number of valuable manuscripts. Among the educational institutions of the city are a cantonal school, a town library with valuable manuscripts of the Reformation period, the museum of the East Swiss Geographical-Commercial Society, the museum of natural history, and the collection of the art society. Saint Gall is the centre of an extensive industrial region famous for its embroideries and white goods, which are exported all over the world. Population, in 1900, 33,116. German is spoken by most of the inhabitants. In the eleventh century the town acquired considerable independence, and, assisted by Imperial privileges and its growing economic importance, it succeeded in obtaining complete independence from its abbots in the middle of the fifteenth century and joined the Swiss Confederacy. The abbey was abolished at the introduction of the Reformation into Saint Gall in 1529, but was restored in 1532 and finally abolished in 1805. In 1803 the Canton of Saint Gall was constituted in the reorganized Swiss Confederacy.

SAINT-GAUDENS, sănt-gâ'dĕnz, AUGUSTUS (1848—). One of the leading American sculptors. He was born in Dublin, Ireland, March 1, 1848, of French and Irish parentage, but the family came to New York City when the boy was six months old. At the age of thirteen Augustus was apprenticed to a cameo-cutter; his long training in this craft had much to do with the delicacy of his later work and his fine feeling for relief. After studying drawing at the Cooper Institute and the Academy of Design, in 1867 Saint-Gaudens went to Paris and entered the atelier of Jouffroy in the Ecole des Beaux-Arts. He was intimately associated with the sculptors Dubois, Mercié, Falguière, and Saint-Marceaux, and identified with the current movement in French sculpture, which was based rather upon the Italian Renaissance than classic work. In 1870 Saint-Gaudens went to Rome, and in 1873 he returned to America. As the first American sculptor to equip himself with complete French training, his work attracted universal attention. His first important work was the sculptured decoration of the chancel of Saint Thomas's Church in New York City, the chief feature of which is a large cross surrounded by panels of kneeling angels. During this early period Saint-Gaudens made many delightful portraits in extremely low relief.

In 1878 he was appointed member of the international jury for the fine arts at the Paris Exposition. At about this time he modeled the interesting monuments of Admiral Farragut for Madison Square and of Governor Randall for

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Sailors' Snug Harbor, both exhibited in 1880. The Farragut monument, the base of which was designed by the architect, Stanford White, embodies, better perhaps than any other of his works, all Saint-Gaudens's best personal and artistic qualities. In the entire field of sculpture there is little finer than the two figures in extremely low relief on the base of this monument. His statue of Deacon Chapin called "The Puritan" in Springfield, Mass., is a splendid idealization. The monument to Lincoln in Chicago is in the same style and spirit, as is also the superb equestrian statue of General Logan in Chicago.

Saint-Gaudens has been extremely successful in certain poetic idealizations. A figure called "The Peace of God," in Rock Creek Cemetery, Washington, the caryatides of a mantelpiece in the house of W. K. Vanderbilt in New York City, and angels for the tomb of Governor Morgan, are fine examples. A fine equestrian statue of General Sherman has recently (1903) been erected at the principal entrance to Central Park. The Diana of the Tower of Madison Square Garden in New York City is the only nude statue which Saint-Gaudens has made. From 1884 to 1896 he was engaged upon an immense work in high relief representing Colonel Shaw of Boston at the head of his colored troops. This, the most ambitious of his productions, is placed in Boston Common, with an elaborate architectural setting.

SAINT-GELAIS, MELLIN DE (1491-1558). A French poet, the most important member of the school of Clément Marot, noted among his contemporaries as a court singer and a skillful master of language. He was educated mainly at Bologna and Padua, and, on returning to France, took orders and received various valuable preferments. His work, though considerable in volume, is mainly composed of very short pieces, epigrams, rondeaux, and the like, composed in a fluent and graceful style. His works were edited by Blanchemain (Paris, 1873).

SAINT GEORGE. One of the Bermuda Islands (q.v.).

SAINT GEORGE, CAPE. See CAPE SAINT GEORGE.

SAINT GEORGE, CONSTANTINIAN ORDER OF. An order of Parma and Sicily, probably established by the Byzantine Emperor Isaac II. Angelus about 1190, under the name of the Order of Constantine. The order remained in the family of the Angeli until it was transferred to Duke Giovanni Francesco Farnese of Parma in 1697. When Don Carlos came into possession of Parma, and later of Naples, the order was reorganized and called after Saint George. The order was finally dissolved in 1860, when Sicily and Parma were incorporated with Italy. The decoration is a red cross of lilies, bearing the image of Saint George and the dragon, the initial of the name of Christ and the letters I H S V, and A and Ω. The Sicilian order had three classes, the Parmesan six. Consult Rhodokanaki, *The Imperial Constantinian Order of Saint George* (London, 1870).

SAINT GEORGE, ORDER OF. (1) A Bavarian order with six classes, established in 1729, and reorganized by King Louis II. in 1871, with the King as grand master. The candidate for admission to the order must show eight generations of nobility on both sides. The decoration is an eight-pointed cross bearing the image of the Virgin and the letters V. I. B. I. (Virgini Immaculatæ Bavaria Immaculata). On the reverse is the image of Saint George with the letters I. V. P. F. (Justus ut Palma Florebit).

(2) A Russian military order with four classes founded in 1769 by the Empress Catharine II. and confined to officers having at least the rank of colonel. The decoration is a white Maltese cross, edged with gold, bearing an image of Saint Geroge and the dragon, and suspended from an orange and black ribbon. See Plate of ORDERS.

(3) A Hanoverian order, established in 1839 by King Ernest Augustus, and dissolved in 1866. The device was "Numquam Retrorsum."

(4) A Sicilian military order of merit, founded in 1808. It was dissolved in 1861.

(5) The original name of the English Order of the Garter. See GARTER, ORDER OF THE.

SAINT GEORGE'S CHANNEL. An arm of the Atlantic Ocean which separates Southern Ireland from Wales and Southern England, and unites the Irish Sea with the Atlantic Ocean (Map: England, A 5). It varies from 60 to about 100 miles in width, is about 100 miles long from northeast to southwest, and has channel depths ranging from 300 to 500 feet.

SAINT-GERMAIN, săn'zhĕr'măn', COUNT OF (died 1784). An eighteenth-century charlatan of European reputation. His origin and life history are unknown. He pretended to be thousands of years old, laid claim to miraculous powers, and surrounded himself with an air of mystery, which, added to his magnificent style of living, fine manners, and an agreeable person, gained him, after 1740, tremendous notoriety in an age that delighted in the mysteries of mesmerism and freemasonry. He first appeared in Parisian society about 1770. Louis XV. of France was among his dupes. He died at Cassel. Consult Oettinger, *Graf Saint-Germain* (Leipzig, 1846).

SAINT-GERMAIN-EN-LAYE, ăn'lā'. A town in the Department of Seine-et-Oise, France, 11 miles west of Paris, on the Seine River (Map: France, H 3). It has an elevated site and, with its picturesque surroundings, is a popular summer resort. A handsome terrace, built in 1672, overlooks the Seine and affords an extended view of the river and adjacent country. The Forest of Saint-Germain is a magnificent park, covering an area of 11,000 acres. In the restored sixteenth-century royal castle are a splendid museum of Gallo-Roman antiquities and a chapel dating from 1240. The town hall has a library and an art gallery. Saint-Germain was at one time the summer home of the French Court. It was the residence of the dethroned James II. of England, who died here in 1701. Here on August 8, 1570, was concluded the treaty terminating the Third Civil War. (See HUGUENOTS.) Population, in 1901, 17,297.

SAINT GILES, CRIPPLEGATE. One of the most notable and historic churches of London, the burial place of George Fox, the author of the *Book of Martyrs*, the explorer Frobisher, and Milton. The church was built in 1545, and was among the few buildings spared by the great fire of London. Remains of the ancient London wall are visible in the churchyard.

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SAINT GOTTHARD, *Fr. pron.* săn gô'tär'. A mountain group in the Lepontine Alps, situated in south central Switzerland, on the boundary between the cantons of Valais, Uri, and Ticino (Map: Switzerland, C 2). It is a rugged mass of granite and gneiss, reaching in Pizzo Rotondo an altitude of 10,489 feet. Saint Gotthard is famous for the pass over the Alps, which at its highest point rises to the height of 6936 feet. By means of this pass, the highroad from Flüelen, on Lake Lucerne, is carried without interruption to Lake Maggiore, in the north of Italy. The road over the pass, constructed between 1820 and 1832, is one of the best and most convenient of the Alpine carriageways, and is free from snow for four or five months of the year. It is remarkable for the grandeur of its scenery, but has, however, been little used since the opening of the railroad. In 1869 and 1871 Germany, Italy, and Switzerland signed an agreement for the construction of a railway with a tunnel through the Saint Gotthard. The tunnel was begun in 1872 and completed in 1881 at a cost of about $13,000,000. It is 9¼ miles long, 26 feet wide, 21 feet high, and reaches an elevation in the centre of 3786 feet. The approaches to the tunnel exhibit the highest order of engineering skill. Consult Spitteler, *Der Gotthard* (Frauenfeld, 1897).

SAINT HELE'NA. An insular possession of Great Britain, situated in the Atlantic Ocean, in latitude 15° 55′ S. and longitude 5° 42′ W., about 1200 miles west of Africa and about 800 miles southeast of the island of Ascension, the nearest land (Map: Africa, D 6). Area, 47 square miles. The island is of volcanic origin and its surface is rugged and mountainous, reaching an altitude of about 2800 feet in the High Hills in the southwest. The coasts are lined with high cliffs, varying in altitude from 600 to 2000 feet. The climate is moderate and healthful and the mean annual temperature is somewhat over 70°. The forests have almost disappeared, and the remarkable indigenous flora, which included a large portion of species peculiar to the island, has been almost wholly supplanted by exotic species introduced from nearly all parts of the world.

The present economic importance of the island is insignificant, its commercial importance having greatly decreased since the construction of the Suez Canal. The island is a Crown colony and is administered by a governor and a council. Population, in 1901, 9850, including nearly 4700 Boer prisoners. Saint Helena is connected by cable with Europe and South Africa, and is an admiralty coaling station. The capital and only port is Jamestown in the northwest, a fortified place with an observatory and a population of about 2500.

Saint Helena was discovered about 1502 by a Portuguese navigator, João da Nova, and was settled by the Dutch in 1645. In 1657 it passed to the British East India Company, but was retaken by the Dutch on several occasions. The island owes its fame to the fact that it was from 1815 to 1821 the place of exile of Napoleon, who died there on May 5, 1821, in the farm-house of Longwood, about 3 miles from Jamestown. During the South African War (1899-1902) many Boer prisoners, including General Cronje (q.v.), were sent to Saint Helena. Consult: Melliss, *Saint Helena: a Physical, Historical, and Topographical Description of the Island* (London, 1875); Brooke, *History of Saint Helena* (ib., 1808-24).

SAINT HEL'EN'S. A manufacturing town in Lancashire, England, on an affluent of the Mersey, 193 miles northwest of London (Map: England, D 3). The town is of modern origin and was incorporated in 1868. It owns its markets, abattoirs, water, gas, electric lighting, tramways, dust destructors, and sewage farm. There are several parks, notably the Victoria, which contains a museum, and the town has a fine town hall, public libraries, and a technical school. Saint Helen's carries on an extensive trade in coal, and has plate-glass, copper, bottle, patent medicine, and other works. There are collieries and deposits of stoneware, clay, and fire-clay. Population, in 1861, 18,396; in 1901, 84,410.

SAINT HÉLIER, *Fr. pron.* săn'tâ'lyâ', or **SAINT HELIER'S.** The capital of Jersey, Channel Islands (qq.v.), a seaport and favorite watering place on the south shore of the island, and on the east side of Saint Aubin's Bay (Map: France, D 2). It has an active English and foreign shipping trade, fisheries, iron foundries, perfume manufactories, etc. The town is well built and granite paved, and has fine markets, esplanades, marine walks, bathing places, aquarium, and parks. Victoria College, the Maison Saint Louis or Jesuit College, with its meteorological observatory and wind tower, the fourteenth-century parish church, the modern Catholic cathedral, hospital, town hall, State house, and public library are the chief buildings. The town is defended by Elizabeth Castle, on a rocky island off the shore, and by Fort Regent on the southeast, built about 1806 on a scarped granite rock. Population, 29,000.

SAINT HENRI, săn tăn'rē'. A city of Hochelaga County, Quebec, Canada. It is a southwestern suburb of Montreal, and a busy industrial section with foundries, tanneries, cotton mills, manufactures of sewing machines, rock-drill implements, etc. Population, in 1890, 13,413; in 1901, 21,192.

SAINT HEN'RY, Order of. A Saxon military order founded in 1736 by Augustus III., King of Poland and Elector of Saxony. It had originally one class, which was increased to three in 1807. The decoration, a gold and white cross of eight points, surmounted by a crown, bears a central medallion with the effigy of Emperor Henry II. on a yellow ground, encircled by a blue band with the words "Frid. Aug. D. G. Rex Sax. Instauravit." The reverse shows the Saxon arms with the legend *Virtuti in Bello.*

SAINT HER'MENGILD, Order of. A Spanish order of merit with three classes, founded in 1814 by Ferdinand VII. The order is conferred for land and sea service; the first class on generals and naval commanders; the second on officers below the rank of brigadier; the third on officers of at least 10 years' standing after service of 25 years. The decoration is an eight-pointed cross of white enamel with a circular medallion bearing the effigy of Saint Hermengild on a blue ground, with the inscription *Premio a la constancia militar.*

SAINT-HILAIRE, săn'tē'lâr', Augustin François César (Prouvencal de) (1779-1853).

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One of the most eminent of French botanists, born at Orleans, France. He was a member of a wealthy French family, and was trained by his father for a business career. In 1816 he sailed for Brazil, where he spent six years in exploration and botanical research, and in 1819 he was elected a correspondent of the Institute. In 1822 he returned to France with one of the most valuable collections of natural history specimens that up to that time had ever been gathered. It consisted of 24,000 specimens of plants of 6000 different species, the greater part of which were new; 2000 birds; 16,000 insects, 135 quadrupeds, and numerous other specimens of reptiles, fishes, and minerals. For several years he devoted himself to the preparation of an elaborate work on the flora of Brazil, which after long delays, caused by his ill-health, was published in 3 volumes in 1825, under the title *Flora Brasiliæ Meridionalis, ou histoire et description de toutes les plantes qui croissent dans les différentes provinces du Brésil.* Meanwhile he had become professor of botany in the Faculty of Sciences at Paris, and in 1830, on the death of Lamarck, succeeded him as a member of the Institute. His botanical investigations resulted in several discoveries of great value, including two entirely new families, the Paronychiæ and the Tamariscineæ; the difference between the aril and the arilode, and the direction of the radicule in the embryonic sac. In addition to his work on the flora of Brazil he published *Aperçu d'un voyage dans l'intérieur du Brésil* (1823); *Mémoire sur le système d'agriculture adopté par les Brésiliens* (2 vols. 1827); *Voyage dans le district des diamants et sur le littoral du Brésil* (2 vols. 1833); *Voyage aux sources du San Francisco et dans la province de Goyaz* (2 vols. 1847); and *Leçons de botanique comprenant principalement la morphologie végétale* (1840-41).

SAINT-HILAIRE, GEOFFROY. See GEOFFROY SAINT-HILAIRE.

SAINT-HILAIRE, JULES BARTHÉLEMY. See BARTHÉLEMY SAINT-HILAIRE.

SAINT HU'BERT, ORDER OF. The highest Bavarian order, founded in 1444 by Gerhardt V., and originally called the Order of the Horn, from the hunting horns which formed the links of the chain. The order has but one class, composed of an unrestricted number of members of princely rank, with not more than twelve members of lower grade. The decoration is a white cross with eight points tipped with golden balls. Three golden rays separate the arms of the cross, which is surmounted by a crown. The medallion represents the conversion of Saint Hubert, with the Gothic inscription *In trav vast* (Firm in faith) on a red band.

SAINT HY'ACINTHE, *Fr. pron.* săNt ē'ä'-săNt'. The capital of Saint Hyacinthe County, Quebec, Canada, on the Yamaska River and the Grand Trunk, the Canadian Pacific, the Drummond County, and the United Counties railroads; 35 miles east-northeast of Montreal (Map: Quebec, C 5). It contains a city hall, Saint Hyacinthe College, and monasteries of the Precious Blood and Dominican Fathers. There are manufactures of leather, organs, tools, boots and shoes, woolen and flannel goods, hosiery, machinery, and farming implements. Population, in 1891, 7016; in 1901, 9210.

SAINT IGNA'TIUS COLLEGE. A Roman Catholic institution in Chicago, Ill., founded in 1870, and conducted by the Fathers of the Society of Jesus. There are two courses: a classical, with collegiate and academic departments, and a commercial. The college confers the degrees of Bachelor of Arts, Science, and Philosophy, Master of Arts, and Doctor of Philosophy. In 1902 the students numbered 500, and the faculty 36. The college has no endowment. Its property was valued at $300,000, and the income was $13,000. The library contained 30,000 volumes.

SAINT IGNATIUS'S BEANS. The seeds of *Strychnos Ignatii*, a shrub or small tree of the natural order Loganiaceæ, a native of Cochin-China and the Philippine Islands. The fruit, which is about the size of a large pear, contains about 20 brownish seeds about as large as olives, rounded on one side, and somewhat angular on the other, which have been used like nux-vomica seeds.

SAINTIN, săN'tăN', JULES EMILE (1829-94). A French genre and portrait painter, born at Lemé (Aisne). He studied under Drolling, Picot, and Leboucher. Afterwards he spent several years (1857-63) in the United States, and some of his works are inspired by American subjects. Most of his pictures are mediocre, and his treatment is likely to be conventional. His paintings include portraits of Paul Morphy (1860), Stephen Douglas (1860), in the Corcoran Gallery, Washington, D. C., and Mme. Carnot (1891). He was elected an associate of the National Academy of Design in 1861, and to the Legion of Honor.

SAINTINE, săN'tēn', XAVIER. The name assumed by JOSEPH FRANÇOIS BONIFACE (1798-1865). A mediocre French novelist, collaborator in some 200 plays, and author of *Picciola* (1837), which won him the Monthyon prize from the Academy.

SAINT ISABELLA, IZ'ä-bĕl'lä, ORDER OF. A Portuguese Order founded in 1801 by the Prince Regent (King John IV.). It consists of 26 ladies, nominated by the Queen. Its chief object is the supervision of the care of the sick and orphans. The decoration is a golden medallion surmounted by a crown and surrounded by golden roses and ribbons. It bears the image of Saint Isabella of Portugal and the device *Pauperum Solatio.*

SAINT IVES. A seaport and market-town in Cornwall, England, on Saint Ives Bay, on the Bristol Channel, 57 miles west-southwest of Plymouth (Map: England, A 6). It is a favorite bathing and winter resort, owing to its mild climate, and is a picturesque town; its church, a granite building of the early part of the fifteenth century, stands on the beach. The town was incorporated in 1639, and owns gas and water works. It is the headquarters of the pilchard fishery. In the vicinity are important tin mines. Population, in 1891, 6094; in 1901, 6700. Consult Matthews, *Saint Ives* (Saint Ives, 1884).

SAINT-JACOB, săN'zhä'kō'. A hamlet in Switzerland, situated a mile south of Basel, and noted as the scene of a great battle in 1444 between the Swiss and the Armagnacs (q.v.) (Map: Switzerland, B 1). As a memorial of this conflict, a monument was erected here in 1872, and

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the anniversary of the battle is celebrated every year. The Swiss fought for ten hours and slew three times their number, but were themselves destroyed, except ten men. The wine of the neighborhood is called *Schweizer Blut*, or Swiss blood.

SAINT JAMES'S COFFEEHOUSE. A former noted resort on Saint James's Street, London, a Whig gathering-place during the eighteenth century. Swift, Goldsmith, Garrick, and Johnson were among its patrons. It was removed about 1806.

SAINT JAMES OF THE SWORD. (1) A military Order of Spain, established during the reign of Ferdinand II. of Leon and Galicia, about 1170, and confirmed by Pope Alexander III. in 1175. It had its origin in an association of thirteen knights, who banded together for the purpose of protecting the pilgrims to the shrine of Saint James of Compostela against the attacks of the Moors. The Order played an important part in the long struggle against the Mohammedan power, but, owing to its extensive privileges and power, aroused the jealousy of the Crown, under whose jurisdiction it was placed in 1493. In 1522 a Papal bull vested the office of grand master in the Spanish monarch. The insignia of the Order is a golden shield, bearing a broad cruciform sword in red. (2) A Portuguese Order (Saõ Thiago da Espada) established as an offshoot of the Spanish Order, about 1290, and sanctioned by a Papal bull in 1320. The Order attained exceeding prosperity and in 1566 was united with the Crown. It was secularized in 1789 and made a civil and military Order of merit. It was reorganized in 1862, to be conferred henceforth for distinguished merit in science, art, and literature. (3) A Brazilian Order established on the removal of the Portuguese royal family to Brazil in 1808. It was secularized in 1843 and suspended in 1890.

SAINT JAMES'S PALACE. The London residence of the British sovereigns, from William III. to the accession of Victoria, and now used for levees and drawing-rooms. The Court of Saint James's is still the official designation of the British Court. It is a large inelegant brick structure fronting on Pall Mall. Originally a hospital dedicated to Saint James, it was reconstructed and made a manor by Henry VIII., who added a park to it, which he inclosed with a brick wall, to connect Saint James's with Whitehall, then the royal residence. Additions and improvements gradually changed the original palace, so that little, if any, of the old structure remains. In 1837 the royal household was transferred to Buckingham Palace. Saint James's Park lies south of the palace and extends over 87 acres. It is embellished with avenues of trees, and a fine piece of water in the centre. On the eastern side is the parade, where the body-guards on duty are mustered, and where the regimental bands perform in fine weather. On the outskirts are situated Buckingham Palace, Stafford House, and Marlborough House. Consult Sheppard, *Memorials of Saint James's Palace* (London, 1894).

SAINT JAN'UA'RIUS, Order of. An order of knighthood founded in 1738 by Charles III., King of the Two Sicilies, as a reward for service in the defense of the Roman Catholic Church and fidelity toward the sovereign. It became extinct in 1861 on the union of Sicily with the Italian Crown.

SAINT-JEAN D'ACRE, sän'zhän' däk'r'. A seaport of Syria. See Acre.

SAINT-JEAN-D'ANGELY, dän'zhä'lē'. The capital of an arrondissement in the Department of Charente-Inférieure, 30 miles south of Niort, on the Boutonne River (Map: France, F 6). Its chief objects of interest are the ruins of the old abbey and the thirteenth-century church. Population, in 1901, 7041. The town grew up around a Benedictine abbey, which the Calvinists destroyed in 1568. It was a Protestant stronghold until its capture by Louis XIII. in 1619.

SAINT JOHN. The chief town of the British West Indian island of Antigua, and capital of the Leeward group; situated on the western side of the island at the end of a somewhat shallow bay (Map: West Indies, R 6). It is well built and has several fine public buildings. The availability of its harbor is somewhat diminished by the bar at its mouth, which makes it inaccessible for heavier vessels. Population, in 1901, 9282.

SAINT JOHN. A city, seaport, and county-seat of Saint John County, New Brunswick, Canada, at the mouth of the Saint John River, on the Bay of Fundy, and on the Intercolonial, the Canadian Pacific, and the Grand Southern railroads, 190 miles northwest of Halifax (Map: New Brunswick, C 4). The harbor is one of the best on the continent; the entrance is protected by Partridge Island, on which are a lighthouse and a quarantine hospital. The channel is protected on the east by a breakwater. The city is built on a rocky peninsula, sloping up from the harbor, and with Portland, a city absorbed since 1889, and Carleton on the west side of the harbor, covers about 6000 acres. The streets are laid out at right angles; they are wide and some of them are cuttings 40 feet deep through solid rock; a steel cantilever railroad bridge and a highway suspension bridge span the river gorge. The principal building materials are brick and stone. Among the public buildings are the court house and jail, the Provincial Insane Asylum, market house, Post-Office, City Hospital, City Hall, Public Library, Sailors' Home, Wiggins Orphan Asylum for Sailors' Sons, Protestant and Roman Catholic orphan asylums, Mechanics' Institute, Masonic and Odd Fellows' halls, and Home for Aged Females. There are electric street railroads and municipal water-works supplied from Little River. The chief article of export is lumber, but there is also an important trade in fish, furs, and agricultural produce. Saint John is the commercial centre of New Brunswick; its shipping ranks third on Canada's official register. The manufactures include ships, lumber, machinery, tools, paper, leather, carriages, boots and shoes, cotton, etc. On January 24, 1604, the feast day of Saint John the Baptist, whence its name, the Micmac Indian settlement here was first visited by Champlain and De Monts. Saint John became a permanent European settlement in 1635. From 1643 to 1645 it was the scene of internecine French conflicts and of the tragic hanging of the whole garrison by a successful rival of the commander. In 1758 it was taken by an Anglo-American force, although it

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had become a British possession under the Treaty of Utrecht in 1713. Its modern growth dates from 1783, when it received an immigration of 10,000 United Empire loyalists. Its charter of incorporation (1785) is the oldest in Canada. Population, in 1891, 39,179; in 1901, 40,711.

SAINT JOHN, Lake. A large lake in the Province of Quebec, Canada, situated about 100 miles north of Quebec (Map: Quebec, D 2). It is nearly circular in shape, with a diameter of about 25 miles, and receives several large streams. Its outlet is the Saguenay (q.v.). It is encircled by wooded hills, is much resorted to by sportsmen, and is the centre of an important and fairly populous dairy region.

SAINT JOHN, Henry. An English statesman. See Bolingbroke, Viscount.

SAINT JOHN, sānt jŏn *or* sĭn'jĭn, James Augustus (1801-75). An English author and traveler, born in Carmarthenshire, Wales, September 24, 1801. He went to London in 1817; edited a Plymouth radical paper; in 1824 was appointed sub-editor of J. S. Buckingham's *Oriental Herald;* in 1827, with David Lester Richardson, started the *Weekly Review;* in 1829 removed to Normandy. He traveled extensively in Egypt and Nubia. Among his numerous works, comprising travel, fiction, and biography, are the following: *Egypt and Mohammed Ali* (1834); *Manners and Customs of Ancient Greece* (1824); *Egypt and Nubia* (1845); *Isis, an Egyptian Pilgrimage* (1853); *The Nemesis of Power* (1854); *There and Back Again in Search of Beauty* (1853); *Philosophy at the Foot of the Cross* (1854); *History of the Four Conquests of England* (1862); *Life of Sir Walter Raleigh* (1868).

SAINT JOHN, John Pierce (1833—). An American political leader, born at Brookville, Ind. He enlisted in the Federal Army in 1862, and worked his way up from private to lieutenant-colonel. At the close of the war he removed to Missouri, and in 1869 settled at Olathe, Kan. He was elected Governor of Kansas in 1879. At the expiration of his term in 1883 he accepted the nomination for President on the Prohibition ticket and polled 151,809 votes. Later, however, he became more radical in his economic views than the majority of his party, and seceded, becoming an independent and advocating prohibition, woman suffrage, free coinage of silver, and anti-imperialism.

SAINT JOHN, Sir Spenser (1825—). An English diplomatist and author, born in London, and educated by private tutors. He early gave his attention to the study of the Malay language. In 1848 he went to Borneo as private secretary to Sir James Brooke, and in 1850 he accompanied Brooke on a mission to Siam. From 1855 to 1861 he was Consul-General at Borneo. He was then transferred to Haiti. He was afterwards Consul-General at Lima in Peru (1874), and after being sent on special missions to Bolivia (1875) and Mexico (1883) he was appointed Minister Plenipotentiary to Mexico (1884). He was transferred to Stockholm in 1893, and he retired from the service in 1896. He was knighted in 1881. He is author of *Life in the Forests of the Far East* (1862); *Life of Sir James Brooke, Rajah of Sarawak* (1878 and 1899); and *Hayti, or the Black Republic* (1885).

SAINT JOHN OF JERUSALEM, Knights of. A military and religious Order, known also as the Hospitalers, Knights of the Hospital, Knights of Rhodes, and Knights of Malta. Its origin is very obscure, and frequently a great antiquity has been claimed for the Order. One or more of the hospices which were establishd in the Holy Land by Pope Gregory the Great, in the sixth century, and cared for by Charles the Great, may have existed until the time of the First Crusade and may thus have given rise to this Order. The special hospital at Jerusalem from which it took its name was either founded or restored by merchants from Amalfi in 1070 or earlier. For some years the brethren were under the rule of Saint Benedict and were engaged strictly in hospital duties. After the capture of Jerusalem by the Crusaders in 1099, a hospital in honor of Saint John the Baptist was founded in Jerusalem and became the cradle of the later Order. The earliest authentic documents which can be dated belong to the years 1099 and 1100. The first head of the brotherhood whose name has been preserved was Gerard, who died probably in 1120. We know little of him, and are not even certain of his nationality. Under his administration the brethren followed the rule of Saint Augustine. His successor was Raymond de Puy, who changed the hospital brotherhood into a military Order and ruled as master until 1158. It is not certain that the Order was sanctioned in 1118, 1120, or 1130, as has been generally stated by the older writers; but in 1153 Pope Eugenius III. confirmed the privileges which had been accorded by Paschal II., Calixtus II., Honorius II., and Innocent II. This confirmation proves that the Order had been recognized earlier.

The brothers were of three classes: Knights, who were of noble birth; Priests or almoners; and Brethren, who were not nobles, but who were fighting men. Most of the members were French. They had to take the three monastic vows of poverty, chastity, and obedience. Their main duty was to aid in the defense of the Holy Land, and during the twelfth century the Hospitalers and Templars (q.v.) were the chief defense of the Kingdom of Jerusalem. At the same time their constant quarrels with one another often endangered the kingdom and prevented complete success in the various military undertakings. They vied with the Templars in wealth and ambition, and were second only to them in public esteem. After the destruction of the Order of the Templars they succeeded to much of its wealth. There were at least twelve commanderies of the Hospitalers in Syria, and branches were gradually established in the countries of Western Europe. The earliest was in France, and dates from the first years of the twelfth century. The house of the Hospitalers at Prague dates from 1159. In all, their possessions in Europe were divided into eight *langues*, or provinces, but some of these were not established until the fourteenth and fifteenth centuries. Their head was known at first as master, and later as grand master. The organization of the twelfth century was gradually modified, and the final form, which is now followed, was given to the Order by the Grand Master Pierre d'Aubusson (q.v.) in 1489. The Order maintained its headquarters in Syria until 1290, when, on account of the rapid conquests of the

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Mohammedans, it was removed to Cyprus. Many of the knights, however, remained in Acre until its capture in 1291. The seat of the Order was in Cyprus from 1290 to 1310, and in Rhodes from 1310 to 1522. Then it passed successively to Crete, Messina, Baiæ, Viterbo, and in 1530 to Malta, which was ceded to the Order by Charles V. of the Holy Roman Empire. Next to Pierre d'Aubusson the most celebrated head of the Order was Jean de la Valette, grand master from 1557 to 1568, who defended Malta successfully against the forces of Sultan Solyman II. (1565). During all of these centuries, and, in fact, until the close of the eighteenth century, the knights still continued to fight against the infidel, and still remained wealthy and famous. In 1798 the island of Malta was seized by Napoleon, whereupon the knights chose Paul I. of Russia as their grand master, counting on his aid against the French. Paul did enter into hostilities with France, and Malta was occupied by the English in 1800, and though the Treaty of Amiens provided for its retrocession to the Hospitalers, the island has remained an English possession. In 1801 the election of a grand master was vested in the Pope, who chose Bailli Tommasi. The latter made his seat at Catania, and the Order at once lost its political, social, and military importance. After the death of Tommasi in 1805, no new grand master was chosen until 1879, when Leo XIII. reëstablished the dignity and fixed the headquarters of the Order at Rome. In the interval the Order had been governed by lieutenants and by a general council, meeting at Rome. Since 1879 the members have entered into hospital service, under the Convention of Geneva. They have business offices in London, near Saint John's gate, a relic of their old priory, and in other capitals. Their dress is a black gown with a white cross. The seal of the Order has always represented the brethren attending a sick person. Many of the records of the local provinces have been preserved, and some have been printed; the archives of the general Order, going back to the twelfth century, are still in existence at La Valletta, Malta.

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SAINT JOHN RIVER. The principal river of New Brunswick, Canada. It rises on the boundary between Maine and Quebec, and flows first northeast through northern Maine, then eastward on the boundary between Maine and New Brunswick, and finally southeast through the latter province till it empties into the Bay of Fundy at Saint John (Map: New Brunswick, B 4). Its length is about 500 miles, and it receives several large tributaries, such as the Allegash and Aroostook, which drain most of the lakes of northern Maine. The upper course of the river still passes through a wild and sparsely inhabited timber region. Shortly after entering Canadian territory it plunges in the Grand Falls over a perpendicular rock 75 feet high. For the last 100 miles the river forms an irregular, winding, and branching lake-like expansion, part of which is known as Grand Lake. Immediately before entering Saint John harbor in the Bay of Fundy this expansion contracts into a narrow, rocky gorge with a fall of 17 feet, presenting very peculiar tide phenomena. At low tide the river above the gorge is 12 feet higher than the level of the harbor, but at high tide it is 5 feet lower, so that the rapids are reversed with every turn of the tide, and vessels can pass through the gorge only during a short period between ebb and flood. The river is navigable for steamers of considerable size 80 miles to Fredericton, for smaller steamers to Woodstock, 145 miles, and at high water to the Grand Falls, 225 miles. Above the falls it is again navigable 40 miles for small steamers. By the Ashburton Treaty its navigation was made free to citizens of the United States.

SAINT JOHN RIVER. A river of Quebec, Canada. See RICHELIEU.

SAINT JOHNS. The capital of Saint Johns County, Quebec, Canada, on the Richelieu River, opposite Iberville, and on the Grand Trunk, Canadian Pacific, and other railways, 27 miles southeast of Montreal (Map: Quebec, C 5). Three bridges span the river and connect with Iberville. The chief buildings are the county and district offices, a lunatic asylum, and military barracks. The town has electric lighting and water-works, manufactures of pottery, silk, etc., and an important river trade in lumber, grain, and agricultural produce. Population, in 1891, 4722; in 1901, 4030.

SAINT JOHN'S. The capital of Newfoundland, on the east side of the peninsula of Avalon, on the Atlantic Ocean (Map: Newfoundland, H 5). The city is built on sloping ground principally on the northern side of the harbor. The northern and southern sides are connected by a causeway and bridges. The city has been improved greatly since the disastrous fire of 1892, when 1800 buildings, including two-thirds of the commercial establishments, were destroyed, the loss amounting to about $16,000,000. The Roman Catholic cathedral stands on the top of the hill above the city, 225 feet above the sea; there is also an Episcopal cathedral. There are Saint Bonaventure College (Roman Catholic), and Anglican, Methodist, and Presbyterian colleges. Saint John's has a medical society incorporated in 1867; the Saint John's Athenæum, having a large library; and the library of the Saint Joseph's Catholic Institute. Among the conspicuous public buildings are: the Government House, the residence of the Governor, the House of Assembly, the Public Hospital, Market-House, Court-House, Custom-House, Poor-House. The water supply is brought four miles from Windsor Lake. The city is lighted by gas and electricity.

The entrance to the landlocked harbor, visible only at close range when approached from the sea, is marked by the Narrows, 2160 feet across

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outside, 570 feet at the narrowest point from Chain Rock to Pancake Rock. On the northern side of the Narrows is a cliff of sandstone and slate rock 300 feet high, and above that towers Signal Hill, 510 feet above the level of the sea. On the southern side of the Narrows there is a hill 650 feet high, on which is a lighthouse called Fort Amherst. Cape Spear and Fort Amherst lights give guidance to vessels entering the excellent harbor. Around the harbor are substantially built stores, warehouses, and wharves, a dry dock capable of raising vessels of 600 tons, and a marine railway. Saint John's receives the bulk of the imports of the colony and has an important trade in clothing, fishermen's and hunters' outfits, and provisions. Its capitalists are mostly non-resident. The manufactures are principally ship-bread, nets, iron, boots and shoes, furniture, etc. It has distilleries, block and rope factories, oil refineries, breweries, and tanneries. Business connected with the fisheries absorbs general attention; there are large exports of seal, cod, and oil. The city is governed by the Legislature. From a fishing hamlet founded in 1580, Saint John's in 1836 had grown to a town of 15,000 inhabitants. Population, in 1891, 25,-738; in 1901, 29,594.

SAINT JOHNS. A village and the county-seat of Clinton County, Mich., 22 miles north of Lansing; on the Detroit, Grand Haven and Milwaukee railroad (Map: Michigan, J 5). It is mainly a residential place, and has a ladies' library and a fine union school building. Saint Johns is situated in a farming and stock-raising region, and is noted for its manufactures of furniture, including extension tables, and sashes, doors, and blinds. There are also grain elevators, and manufactories of gasoline engines, agricultural implements, and quilts. Population, in 1890, 3127; in 1900, 3388.

SAINT JOHN'S BREAD. The locust-tree. See CAROB.

SAINT JOHNSBURY. A village and the county-seat of Caledonia County, Vt., 34 miles east by north of Montpelier; on the Passumpsic River, and on the Boston and Maine and the Saint Johnsbury and Lake Champlain railroads (Map: Vermont, F 4). It has the Saint Johnsbury Academy, Fairbanks Museum, an art gallery, and a public library with more than 16,000 volumes. At Saint Johnsbury are the works of the Fairbanks Scale Company, one of the largest establishments of its kind in the world, and manufactories of steam hammers, hoes, forks, and other agricultural implements. The village is also an important trade centre. The government is vested in a board of village trustees. There are two systems of water-works, one owned and operated by the municipality. Population, in 1890, 3857; in 1900, 5666.

SAINT JOHN'S COLLEGE. A college at Cambridge, England. It was founded in 1511 by an endowment left by Lady Margaret Beaufort, Countess of Richmond and Derby, mother of Henry VII. The college succeeded to the site and buildings of a Hospital of Saint John, founded by Henry Frost in 1135, and altered to admit secular students. The students, not agreeing with the regulars, were removed in 1284 to the new foundation of Peterhouse. Saint John's is the second college of Cambridge in size and importance. The foundation consists of a master, 56 fellows, 60 scholars, and 9 so-called 'proper' sizars. There are some 200 undergraduates in all. The college has a considerable number of prizes, exhibitions, and studentships, and presents to 50 livings. The college buildings are extensive and of great beauty. The library contains about 50,000 volumes, numerous letters, and over 400 manuscripts.

SAINT JOHN'S COLLEGE. A college at Oxford, England. It owes its origin to Archbishop Chichele, founder of All Souls' College (q.v.), who converted a house of Bernardine monks into Saint Bernard's College in 1436. At the dissolution of the monasteries, Henry VIII. gave this college to Christ Church College, which in turn transferred it to Sir Thomas White. He established on this foundation in 1555 the present college, dedicated to the study of sacred theology, philosophy, and the Good Arts, and he is therefore its real founder. The college was largely added to by the generosity of Laud (q.v.), who was for a time its president. It consists of a president, 15 fellows, a number of honorary fellows, lecturers, and tutors, 4 Fereday fellows, 37 scholars, a number from the Merchant Taylors' School, 4 exhibitioners, a chaplain, an organist, and a choir, with some 175 undergraduates in all.

SAINT JOHN'S COLLEGE. A non-sectarian collegiate institution at Annapolis, Md., chartered in 1784 and opened in 1789. It was developed from King William's School, established in 1696, and is therefore one of the oldest of American colleges. Its campus is picturesquely situated on Severn Creek, a few miles from Chesapeake Bay, with commodious buildings valued in 1903 at $250,000. The collegiate department embraces four courses: classical, Latin-scientific, scientific, and mechanical engineering, which lead to the degrees of Bachelor of Arts and Bachelor of Science. There is also a preparatory school, with 52 students in 1903, in which year the collegiate department had an attendance of 103 and a faculty of 10 instructors. The endowment was $5000 and the income $23,000. The library contained 9000 volumes.

SAINT JOHN'S COLLEGE, FORDHAM. A Roman Catholic institution, in the Borough of the Bronx, New York City, organized in 1841. The administration was in the hands of secular priests until 1846, when the college was purchased by the Fathers of the Society of Jesus. The estate embraces about 70 acres, with nine buildings. The income in 1902 was $66,262, and the value of the college property $1,553,200. In 1902 the students numbered 442, including 85 in the college, 315 in the academic department, and 42 in the grammar school. There were 41 instructors, and the library contained 53,000 volumes. The college confers the degrees of B.A., B.S., and M.A.

SAINT JOHN'S EVE. The night before the festival of Saint John Baptist (June 24th), or Midsummer Eve. It seems to have been observed with similar rites in every country of Europe. Fires were kindled chiefly in the streets and market places of the towns; sometimes they were blessed by the parish priest, and prayer and praise offered until they had burned out; but as a rule they were secular in their character, and conducted by the laity themselves. The

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young people leaped over the flames, or threw flowers and garlands into them, with merry shoutings; songs and dances were also a frequent accompaniment. The kindling of the fire, the leaping over or through the flames, and the flower-garlands render plausible the theory that these rites are essentially of heathen origin, and of a sacrificial character, possibly connected with the worship of the sun.

SAINT JOHN'S RIVER. The principal river of Florida. It rises in the swamps of Brevard and Osceola counties, and flows northward, roughly parallel with, and 20 miles from, the Atlantic coast (Map: Florida, G 1). It empties into the Atlantic Ocean 25 miles south of the Georgia boundary. It is a sluggish stream passing through a low and level country and bordered by luxuriant semi-tropical vegetation. From its source downward it passes through a chain of lakes, the largest of which is Lake George. From that lake to its mouth, about 200 miles, the river expands into the form of a lagoon from one to five miles wide. A channel is kept open by means of jetties through the bar at the mouth, and the river has been dredged to a depth of 18 feet to Jacksonville, about 20 miles. There is a depth of eight feet as far as Lake George, while small steamers ply regularly as far as Enterprise, 230 miles, and may ascend some distance beyond.

SAINT JOSEPH. A river of southwestern Michigan. After making a detour into Indiana it flows northwest into Lake Michigan at the town Saint Joseph (Map: Michigan, H 7). It is 250 miles long and navigable about 100 miles for small steamers.

SAINT JOSEPH. A city and the county-seat of Berrien County, Mich., 60 miles by water east of Chicago, Ill.; at the mouth of the Saint Joseph River, on Lake Michigan, and on the Père Marquette, the Lake Shore and Michigan Southern, and other railroads (Map: Michigan, G 6). A daily line of passenger and freight steamboats connects with Chicago. Saint Joseph is a popular summer resort. Among its features are the Carnegie Library, Lake Front Park, and Battery Beach. The surrounding district is chiefly interested in fruit-growing, and for this industry the city is an important centre. There are also iron works, paper mills, lumber mills, knitting mills, and manufactories of boats, fruit baskets and packages, motor bicycles, and flour. The government is administered by a mayor, elected annually, and a unicameral council. The city owns and operates the water-works and the electric light plant. First settled in 1829, Saint Joseph was incorporated as a village in 1836, and received a city charter in 1892. Population, in 1890, 3733; in 1900, 5155.

SAINT JOSEPH. The third city of Missouri and the county-seat of Buchanan County, on the Missouri River, 62 miles north of Kansas City and 132 miles south of Omaha, Neb. (Map: Missouri, B 2). Nine railroads give the city excellent transportation facilities. They are the Atchison, Topeka and Santa Fe; the Chicago, Rock Island and Pacific; the Chicago, Burlington and Quincy; the Kansas City, Saint Joseph and Council Bluffs; the Hannibal and Saint Joseph; the Burlington and Missouri River; the Chicago Great Western; the Saint Joseph and Grand Island; and the Missouri Pacific. A steel bridge connects the city with its Kansas suburb, Elwood.

Saint Joseph is nine and a half square miles in area, and, being built along the bluffs which lie close to the Missouri River, has an unsurpassed drainage system. The city has a river front of three miles. There are 280 miles of streets, of which fifty miles are paved. Vitrified brick is the most popular paving material, but asphaltum, macadam, and granite blocks are used where the service requires them. There are 85 miles of water mains and 52 miles of gas mains in the city.

Among the prominent buildings are the court-house, the new public library, live-stock exchange, high school, Carnegie Library, post office, and city hall. State Hospital for Insane, No. 2, is located here, as is also the State Fish Hatchery. Other features are the Sacred Heart Academy, Home for Little Wanderers, Memorial Home for Aged People, Saint Joseph's Hospital, Ensworth Hospital, Benton Club, and the Commercial Club. Mount Mora Cemetery is of interest. There are two medical colleges, and a large number of private schools; and thirty public and four parochial schools, with an enrollment (1903) of 31,764 pupils. There are more than forty miles of track in the street railway system, at the north end of which is Krug Park, and at the south Lake Contrary.

The stock yards have a daily capacity of 20,000 cattle, 30,000 hogs, 15,000 sheep, and 2000 horses and mules. The packing houses do a business of $50,000,000 annually, exclusive of poultry, which is valued at $1,000,000. Saint Joseph has also very large shirt and overall factories, which with other manufacturing establishments give employment to nearly 20,000 persons. The value of the manufactured products is $35,000,000 a year, and the jobbing trade amounts to $75,000,000. There are also harness, collar, saddle, trunk, plow, glue, candy, furniture, shoe, and cracker factories, flour, hominy, and woolen mills, machine shops, foundries, etc.

The mayor and council are elected for two years and the president of the council for four years. The city's revenue is $413,800. Some of the principal expenditures are: Fire department, $72,000; police department, $68,400; streets, sewers, and bridges, $51,000; water service, $33,000; and street lighting, $33,000. The city owns its lighting plant. The assessed valuation is $30,000,000; and the municipal debt, $1,108,000.

Saint Joseph dates from 1826, when Joseph Robidoux, an Indian trader and trapper, opened a trading post a short distance above the present site of the city, at Roy's Branch. In 1830 he moved to the Blacksnake Hills, now in the heart of the city. The first post office was established in 1840, and in 1843 'Blacksnake Hills' had a population of 500. The plats of Saint Joseph were recorded July 26, 1843, when the change in name took place. Saint Joseph became the permanent county-seat in 1846, and in 1853 it was chartered as a city. During the excitement over the discovery of gold in California in 1849, the city was a prominent outfitting and starting point for miners. The first census of Saint Joseph, taken in December, 1846, showed a population of 936. Its growth since the Civil War has been very rapid, the population in 1870 being

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19,565; in 1880, 32,431; in 1890, 52,324; in 1900, 102,979.

SAINT JOSEPH, ORDER OF. A former grand-ducal order of Tuscany, founded in 1514 and extinguished in 1860. It had three classes, and was restricted to persons of noble birth.

SAINT-JUNIEN, săn'zhụ'nē'ăn. A town of the Département of Haute-Vienne, France, on the right bank of the Vienne, 18 miles north-northwest of Limoges. The beautiful twelfth-century abbey church contains a sculptured tomb of the patron saint from whom the town takes its name. Saint-Junien has a college. The manufactures of gloves and straw paper, and the leather-dressing, felt, and clog factories are important. Near by are a large porcelain plant and slate quarries. Population, in 1901, 11,432.

SAINT-JUST, zhụst, ANTOINE (c.1767-94). A French revolutionary leader, born at Decize, in Nivernais. He was the son of a retired cavalry officer and was educated at Soissons by the Oratorians. He went to Rheims to study law, but soon returned to his native village, where he devoted himself exclusively to literature. When the Revolution broke out Saint-Just was in Paris in connection with the publication of his poem *Organt*, and he was at once transported with republican enthusiasm. Later on he became a lieutenant-colonel in the National Guard of his commune, and was present at Paris in 1790 to assist at the Fête of the Federation. In 1791 appeared his *Esprit de la révolution et de la constitution de la France*, in which the various causes of the Revolution were dealt with; and in the following year he was chosen Deputy to the Convention by the electors of Aisne. He voted for the death of the King and became one of Robespierre's strongest and most influential supporters. In all the fierce debates of this period Saint-Just took a leading part. He also displayed a great capacity for administrative organization. After the fall of the Girondists in June, 1793, Saint-Just became more prominent than ever. He had been chosen a member of the Committee of Public Safety in April, and during the Reign of Terror he showed himself well fitted to be the associate of Robespierre and Couthon. On February 19, 1794, he was elected president of the Convention. He drew up the report which led to the arrest and execution of Danton and his adherents. With Robespierre, Saint-Just fell on the fateful Ninth Thermidor, and with him was guillotined on the following day, July 28, 1794. For the life of Saint-Just, consult Fleury, *Saint-Just et la Terreur* (Paris, 1851), Hamel, *Histoire de Saint-Just* (ib., 1859), both of which, however, are biased; one of the best brief accounts is that in Aulard, *Les orateurs de la législative et de la convention* (Paris, 1879-81).

SAINT KITTS. One of the Leeward Islands. See SAINT CHRISTOPHER.

SAINT LAW'RENCE. A river of North America (Map: Canada, R 7). The basin of the Saint Lawrence includes the entire system of the Great Lakes, constituting the largest body of fresh water in the world. Its drainage area and rate of discharge, however, are much less than those of the Mississippi.

The name Saint Lawrence River is properly confined to the outlet of Lake Ontario, flowing from the northeastern extremity of that lake in an almost straight northeast course of about 700 miles to the Gulf of Saint Lawrence, through which it enters the Atlantic Ocean. For a distance of 30 miles below Lake Ontario the river is from 4 to 10 miles wide, but this wide expanse is filled with a wilderness of beautiful rocky and wooded islands, known as the Thousand Islands, ranging in size from about 20 square miles to mere rocks bearing a few trees. Below this expansion the river maintains an average width of 1¾ miles as far as Quebec, narrowing in some places to less than a mile, and widening in others into lakes nearly 10 miles wide. The fall of the river from Lake Ontario to Quebec is 240 feet, nearly the whole of which is accomplished above Montreal in a series of rapids separated by long reaches of quiet water. The upper rapids occur where the Laurentian spurs cross the river to form the Adirondacks; the lowest are the Lachine Rapids, just above Montreal harbor, where a line of igneous rock traverses the plains. From Montreal to Quebec the river passes between low banks through a wide, cultivated plain. Tide-water is reached at Three Rivers, about half way between Montreal and Quebec, and at the latter city the spring tide rises 18½ feet, while salt water becomes noticeable 30 miles below. At Quebec begins the great estuary, which is 350 miles long, and widens gradually from 10 miles below the island of Orleans to about 90 miles at the west end of Anticosti Island, where it enters the gulf. The south shore continues low some distance below Quebec. The north shore soon becomes high and bold, and toward the mouth of the estuary the south shore also is lined with high, rugged, and forest-covered mountains. The chief tributaries of the Saint Lawrence proper are the Ottawa, which enters it from the north through several channels around the islands at Montreal, and whose dark, amber-colored waters flow side by side with the light blue of the main stream until tide-water is reached; the Richelieu, the outlet of Lake Champlain, which enters the river from the south some distance below Montreal; and the Saguenay, flowing into the estuary. Instead of the river entering the ocean through a shallow and shifting delta, the valley of the Saint Lawrence has been submerged through the sinking of the land, so that its entrance is about 90 miles wide and 1200 feet deep. A depth of 600 feet extends half way to Quebec, and the river is 100 feet deep nearly or quite up to that city. Between Quebec and Montreal the natural depth is over 20 feet, and the channel has here been deepened so that the largest ocean steamers can pass up to the wharves at the latter city. Above Montreal the rapids are passed by a series of 9 canals, with a total length of 42 miles, and provided with locks, each of which is 45 feet wide and 270 feet long, with 14 feet of water on the sills. These canals, however, are used only on the up-stream route; on the return trip even the passenger steamers descend the rapids. For the navigation of the waterways above the Saint Lawrence proper, see GREAT LAKES. Consult Steckel, *Water Levels* (Ottawa, 1893).

SAINT LAWRENCE. An island in Bering Sea, belonging to Alaska, between that Territory and Siberia, to the southwest of Cape Nome (Map: Alaska, B 3). Its greatest length and width are respectively 90 miles and 30 miles.

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It reaches its greatest height toward the east, where the hills have an elevation of over 500 feet. On the fringe of the Arctic zone, the island is sparsely peopled by Eskimos, who engage in whale, seal, and walrus fisheries, and have trading relations with the mainland. Bering discovered the island in 1728; fifty years later it was visited by Captain Cook, who thought it comprised two islands, which he named Saint Lawrence and Clark.

SAINT LAWRENCE, Gulf of. An inlet of the northern Atlantic, bounded by the western shore of Newfoundland, and the shores of the Canadian provinces of Quebec, New Brunswick, Nova Scotia, and Prince Edward Island (Map Canada, S 7). It has three communications with the ocean—the Strait of Belle Isle, between Newfoundland and Labrador; the Gut of Canso, between the island of Cape Breton and the peninsula of Nova Scotia; and Cabot Strait, 62 miles wide, with the island of Saint Paul in the middle, between Cape Breton and Newfoundland. In the opposite direction it narrows at the western end of Anticosti into the estuary of the Saint Lawrence River. Besides Anticosti, Saint Paul's, and Prince Edward the gulf contains several clusters of islands, more particularly in its southern half, among them being the Magdalens. The northern shore, which is bold and rocky, is fringed with small islets. The waters are frequently rendered dangerous to shipping by thick fogs and uncertain currents. The passages from the ocean to the river, however, are clear, broad, and deep channels, the one through Cabot Strait being 1200 feet, and the one through the Strait of Belle Isle 600 feet deep. The latter is the route taken by transatlantic steamers. The Gulf of Saint Lawrence is celebrated for the productiveness of its fisheries.

SAINT LAZ'ARUS, Order of. An Order of chivalry founded in Palestine for the purpose of caring for sick pilgrims, and transferred to Europe after the destruction of the Christian power. The chief seat of the Order was at Boigny, in France. It was merged in the Order of Our Lady of Mount Carmel, founded in 1807, and was thenceforward known as the "Ordre militaire et hospitalier de Saint Lazare et de Notre Dame du Mont Carmel réunis." It was dissolved in 1830.

SAINT LEGER, sānt lĕj'ĕr *or* sĭl'ĭn-jĕr, Barry (1737-89). A British soldier in the American Revolution. He entered the army as an ensign in 1756, and in the following year was sent to America to fight against the French. He served under General Abercrombie, took part in the siege of Louisburg in 1758, and fought under Wolfe at Quebec. When the British Ministry planned the campaign of 1777 against the revolted colonists, Saint Leger, then a lieutenant-colonel, was chosen to command an expedition which was to go up the Saint Lawrence to Lake Ontario, land at Oswego, and, with the assistance of Sir John Johnson and the Indians, capture Fort Stanwix, and then march down the Mohawk Valley and join General Burgoyne. On August 3, 1777, Saint Leger reached Fort Stanwix, and three days later fought the battle of Oriskany (q.v.) with a relief force under General Herkimer. On the 22d of the same month the approach of a second relief force under General Arnold produced such a panic among Saint Leger's men that they retired in great haste to Canada. Saint Leger continued to serve in Canada and on the northern border of the colonies, and in 1780 he was promoted colonel. He published *Saint Leger's Journal of Occurrences in America* (London, 1780).

SAINT LEONARDS, lĕn'ĕrdz, Edward Burtenshaw Sugden, Baron (1781-1875). An English lawyer, born in London. In 1802 he began the study of law, and three years later became known by his *Practical Treatise of the Law of Vendors and Purchasers of Estates* (1805). He was called to the bar in 1807. He was returned to Parliament in 1828, was knighted and made Solicitor-General in 1829, and became Lord Chancellor of Ireland in 1835, and again from 1841 to 1846. He was appointed Lord Chancellor of England and raised to the peerage in 1852. The fourteenth edition of his *Law of Vendors and Purchasers* was published in 1862. He published many other valuable legal treatises.

SAINT-LÔ, săn'lō'. The capital of the Department of Manche, France, 47 miles southeast of Cherbourg, on the Vire River (Map: France, E 2). The principal building is the Gothic Cathedral of Notre Dame, dating from the fourteenth century. It was remodeled in the seventeenth century. The town hall, museum, hall of justice, and prefecture are among the features of the town. Horse-breeding is extensively carried on, and there are manufactures of cloth, leather, etc. Population, in 1901, 11,604. The industrial prominence of the town suffered severely through the revocation of the Edict of Nantes.

SAINT-LOUIS, săn'lōō'ē'. The capital of the French colony of Senegambia, situated on a small island in the delta of the Senegal, about 12 miles inland and 163 miles by rail northeast of Dakar (Map: Africa, C 3). It is a well laid out town, with a number of public buildings. The climate is extremely unhealthful. At the mouth of the river is a sand bar which practically deprives Saint-Louis of all value as a port. The town was founded in 1626. The population, about 20,000, is extremely heterogeneous.

SAINT LOUIS, sānt lōō'ĭs *or* lōō'ē. The chief city of Missouri and of the States formed from the 'Louisiana Purchase' of 1803; in population, the fourth city of the United States and the principal city of the Mississippi Valley (Map: Missouri, F 3). It is situated on the west bank of the Mississippi River, 1170 miles from New Orleans and 729 miles from Saint Paul; about 20 miles below the mouth of the Missouri, and 174 miles above the mouth of the Ohio; in latitude 38° 38′ N.; longitude 90° 12′ W.

Description. The city, as originally founded, occupied a bluff of the 'Saint Louis limestone,' one of a series extending north and south along the west bank of the river, from which the land gradually rises westward in rolling hills. The lowlands of the Mississippi, known at this point as the American bottoms, are wholly on the east, or Illinois, side of the river. Although in the central part of the city the original bluffs have been graded away for convenience of access to the river, the city, now extended north and south beyond its original site, still enjoys the advantages of a limestone foundation. It has a river frontage of 19.15 miles, with a depth in a direct line to the extreme western limits of 6.6

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miles. The area included within these limits is 62.5 square miles.

The original site of the city, now a small part of the business district, lay below the crest of a hill, not far from Broadway, the present north and south thoroughfare, which follows the general course of the river, at a minimum distance from it approximating one-eighth of a mile. The city lies within a curve of the river having a general easterly direction. The characteristics impressed on the city by its original French founders exist now only in a few streets between Broadway and the river; and even there, except in a few unchanged buildings, such as the Catholic Cathedral on Walnut Street, they are hardly to be detected. The streets are narrower than elsewhere in the city, and the buildings still used or formerly used for residences show the influence of the Colonial style in their architecture.

The tendency of the modern city has been toward exact regularity. Wherever possible, its streets have been laid out at right angles from north to south and from east to west. Market Street, selected as the original line dividing the city into its northern and southern portions, is no longer a central thoroughfare, but the streets are numbered north and south from it, as they are also west from the river.

The chief eastern and western thoroughfares leading out from the central part of the city are Washington Avenue and Olive Street, with Franklin Avenue connecting with Easton Avenue to the north. South of Olive Street, Market connects with Manchester Avenue, running through the city southwestwardly, while Chouteau Avenue, the next thoroughfare south of Market, runs east and west to Forest Park. Broadway follows the course of the Mississippi from the River Des Peres at the extreme south to the extreme northern limit of the city. Grand Avenue, planned as a boulevard spanning the city on the west, is now almost centrally located. Jefferson Avenue, east of it, unites with Broadway on both north and south to form a complete thoroughfare. West of Grand Avenue—where the principal avenues and boulevards are interrupted by parks and places or by the various 'additions' made to the city independently of each other—thoroughfares are formed only by a connecting series of streets.

BUILDINGS. The old Walnut Street Cathedral is the most notable survival of the French period of the history of Saint Louis. The interior of the Church of Saints Peter and Paul, the oldest German Catholic church in the city (1848), is Gothic. The Broadway Court House (1839-62), the best example of the classic style in the city, is in the form of a Greek cross, surmounted by a dome 198 feet in height, with a rotunda 60 feet in diameter. The four circular galleries within the dome give opportunity for viewing the frescoes by Wimar; panels of "The Discovery of the Mississippi by De Soto," "The Founding of Saint Louis by Laclède," the Indian massacre of 1780, and a landscape panel. There are also figures of Law, Commerce, Justice, and Liberty. The only public building of the same school of architecture comparable in purity of style is the much costlier Federal Custom House and Post Office (1888). It has a frontage of 132 feet on Olive Street by 177 feet on Eighth and Ninth, with a height of 184 feet to the top of the cupola surmounting its dome. The new City Hall, in Washington Square, described as Romanesque, distinctly suggests a French hôtel-de-ville of the sixteenth century. The blended Renaissance and later mediæval influences of Northern Europe again predominate in the architecture of the imposing Union Station, on Eighteenth and Market streets, directly west of the City Hall. The new buildings of the Washington University, the most extensive and complete in the city, are adaptations of the Tudor-Gothic fortified palace. Italian Renaissance is the style of the Museum of Fine Arts, whose façade, with sculptures by Kretschmar, is perhaps the most satisfactory in the city. The Protestant Episcopal Cathedral, dating from early in the second half of the nineteenth century, shows both in exterior and interior the influence of the Saxon style in modifying the Gothic. The Shaare Emeth Synagogue, one of the most impressive of the modern religious edifices, shows the Byzantine influence modifying the Gothic in the body of the building, to which is added a campanile of the earlier Italian Renaissance, adapted to the Gothic. The new Roman Catholic Cathedral, the Second Presbyterian Church, and the majority of the important church buildings erected since 1880 are either Gothic or Renaissance modifications of the Gothic.

Of business structures representative buildings are the Laclède, the Union Trust, the new Mercantile Library, the Board of Education and Public Library, the Oddfellows' Hall, the Rialto, the Commonwealth Trust, the Equitable, the Commercial, the Boatmen's Bank, the National Bank of Commerce, and the collection of buildings known as 'Cupples Station,' where a considerable part of the wholesale trade of the city is centred at the most advantageous point for handling freight. The Mercantile Club building is in the business centre. The buildings of the Saint Louis Club, the University, the Marquette, the Columbian, the Union, and other clubs away from the business centre, represent different styles of residence architecture. The new buildings of the Saint Louis University, the Central High School, the Young Men's Christian Association, and others of a public or semi-public character, have a general tendency to reproduce the styles of the palaces and unfortified public buildings of the fifteenth and sixteenth centuries in England and France. The Pilgrim Congregational Church, Saint George's (Protestant Episcopal), the Union Methodist Episcopal, the Grand Avenue Presbyterian, the Church of the Messiah (Unitarian), the Beaumont Street Baptist Church, and the several Jewish synagogues of the west end represent the more modern ecclesiastical architecture of the city.

For the buildings of the World's Fair of 1904, see SAINT LOUIS WORLD'S FAIR.

PARKS. The twenty-three public parks, places, and gardens of the city have a total area of 2183 acres, including that part of Forest Park temporarily used as part of the grounds of the Louisiana Purchase Exposition. Forest Park, the largest of these, dates from 1874. It is almost directly west of the business centre. Its area of 1371 acres represents a cost of $2,304,669 for ground and improvements. When acquired by the city it was far from the principal residential section, but its attractiveness has exerted so

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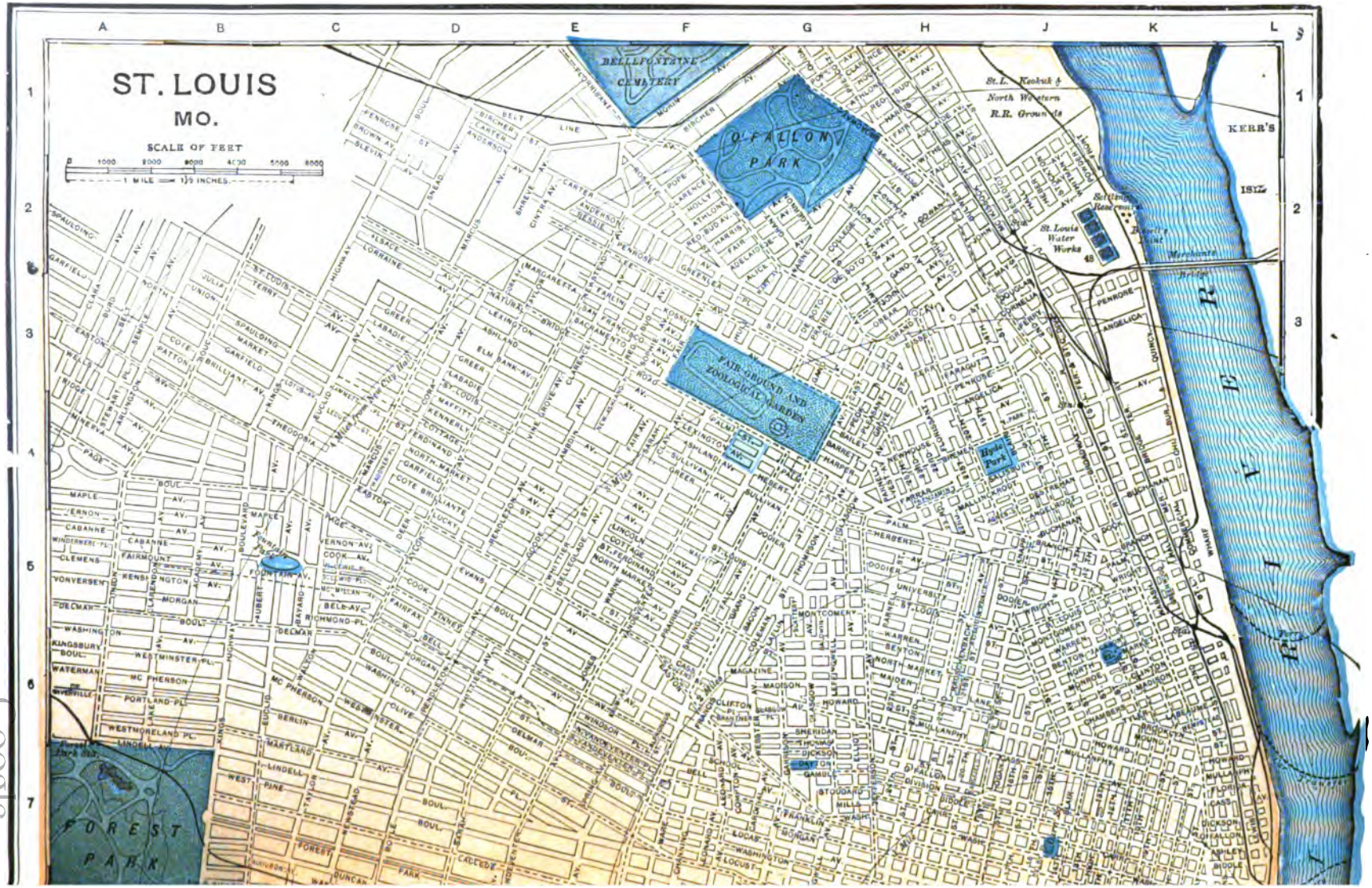

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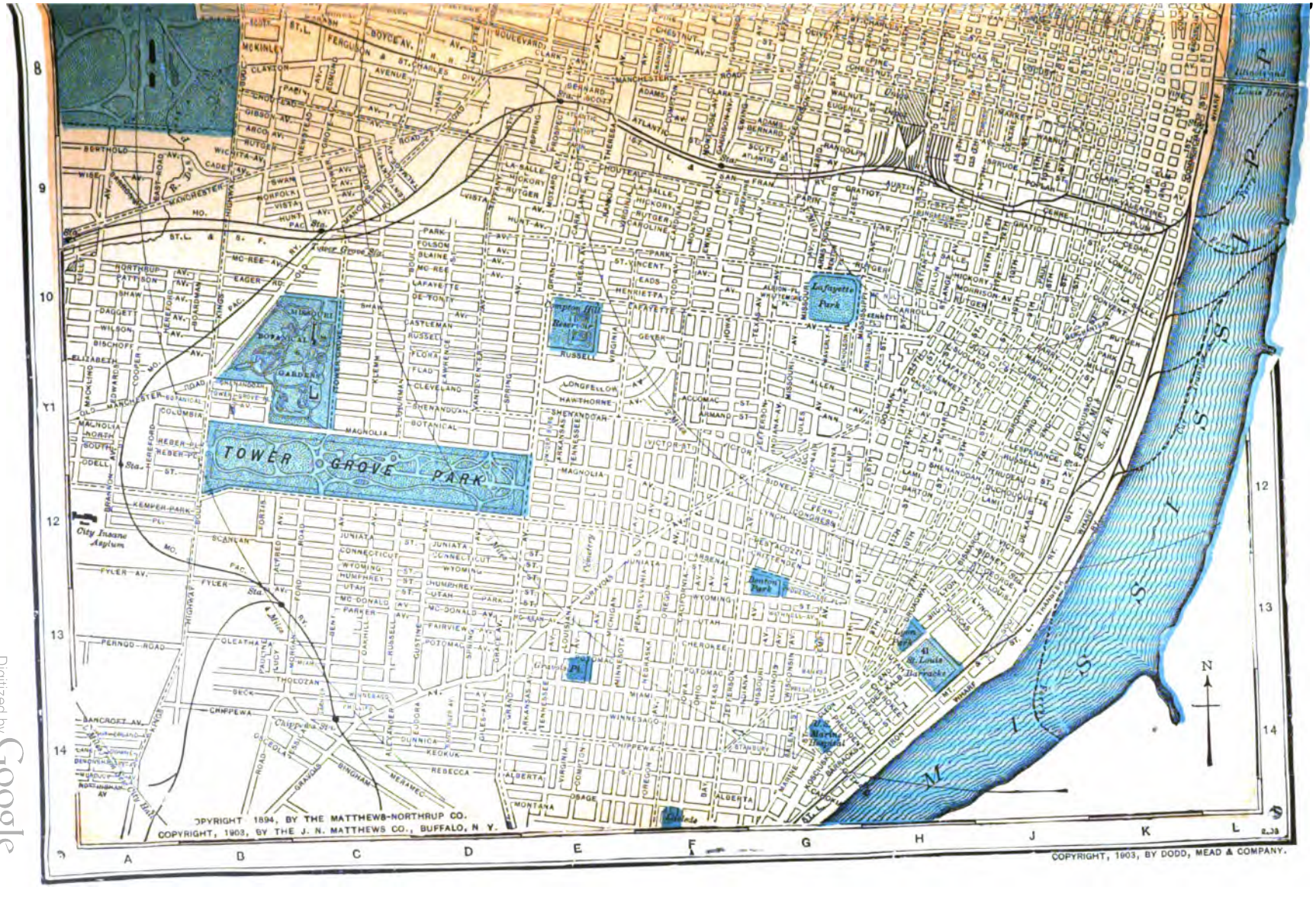

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marked an influence that the residential section has grown toward it, and its beauties are reproduced in neighboring private residence-parks, or 'places.' For these, the number of which is not included in the total above, the city is remarkable.

The principal parks of the southwestern part of the city are Tower Grove and the Missouri Botanical Garden adjoining it. Both of these are a gift of the late Henry Shaw, whose interest in plants made the Botanical Garden's collection of native and foreign flora one of the most extensive in America. The garden, now maintained for the public by special commissioners, has an arboretum adjoining it, containing specimens of the American forest trees which will grow unprotected in the climate of Missouri. Tower Grove Park, with an area of 206 acres, ranks next to Forest Park as the driving park of the city. It is highly improved, with an impressive central gateway on the east, opening on a long avenue, which, as it divides the park, has the heroic bronzes by Von Mueller, cast in Munich during Shaw's lifetime, and by him presented to the city.

Carondelet Park (containing 180 acres) and O'Fallon Park (158 acres) rank next in area. Lafayette Park, with an area of 29 acres, is more centrally located in what was formerly the most important residential section of the southern part of the city. Up to the close of 1902, the total cost of the parks, acquired and improved at public expense, was $4,011,862, inclusive of improvements and maintenance. This does not include the four parks managed by special commissioners.

The most interesting objects of art in the parks are probably the bronze statues of Shakespeare, Columbus, and Humboldt, by Von Mueller, in Tower Grove. That of Shakespeare is supported by a pedestal with bronze panels, giving in relief the grave scene in *Hamlet*, Lady Macbeth in the sleep-walking scene, Queen Catharine confronting her accusers, and Falstaff as impersonated by Ben De Bar. The recumbent portrait statue of Henry Shaw in the Shaw mausoleum in the Missouri Botanical Garden is by the same sculptor. A bronze statue of Thomas H. Benton in Lafayette Park is the work of Harriet Hosmer. On its pedestal are the words, "There is East, there is India," which constituted the climax of his speech made after the withdrawal of his opposition to the first transcontinental railroad. This statue, erected at the expense of the State, commemorates the completion of the railroad connecting Saint Louis with the Pacific Coast. Lafayette Park contains also a good bronze reproduction of Houdon's statue of Washington. Wellington Gardner's statue of Francis Preston Blair stands near the eastern entrance of Forest Park. J. Wilson MacDonald's statue of Edward Bates, Attorney-General in Lincoln's first Cabinet, is near the southeast corner of the same park. The marble statue of Schiller in Saint Louis Park is a reproduction of the portrait statue of the poet erected at his birthplace, Marbach. The striking bronze statue of General Grant, first erected on Twelfth Street, now stands in front of the southern entrance of the City Hall. It is the work of Robert P. Bringhurst.

EDUCATION, LIBRARIES. The school system of Saint Louis is notable in several particulars, chiefly in its application of the theory of manual training in connection with the work of Washington University, and in its pioneer work in illustrating the practical workings of the theories of Froebel. The school buildings represent a total cost of $6,354,000. The number of teachers employed at the close of the fiscal year 1902 was 1724, with annual salaries of $1,079,191. The number of pupils in 1902, including 10,096 in the kindergartens, was 84,774. The annual expenditure of $1,681,907, out of a revenue of $2,155,000 under the general fund, was for maintenance only, exclusive of expenditures for new buildings and improvements. The city has begun supplying free books, and it supports the free public library as an essential part of the system of public education.

Among the private institutions are Washington University (q.v.), with the Manual Training School and School of Fine Arts, University of Saint Louis (q.v.), Forest Park University for Women, the Christian Brothers' College, the Saint Louis College of Physicians and Surgeons, the Homeopathic Medical College of Missouri, the Missouri School for the Blind, the Kenrick Theological Seminary, and the Saint Louis Law School, now a department of Washington University.

The principal libraries are the Public and the Mercantile. Among minor libraries, that of the Missouri Historical Society is most important. The Mercantile Library, maintained by private subscription, occupies the upper portions of its own building on Broadway and Locust Street. It has more than 3000 members, and a total of 127,000 bound volumes. It is especially rich in Americana relating to the history of colonial Louisiana and the States and Territories formed from it. Among the objects of art in its possession are the marbles Beatrice Cenci, by Harriet Hosmer; the West Wind, by T. R. Gould; and portrait busts of Burns and Scott by William Brodie, R. S. A. Among its paintings are a series of the Indian studies by Catlin, and the most important of Bingham's canvases illustrating the life of the early West. The Public Library has 166,339 volumes (1903), with an annual circulation of more than a million volumes.

SOCIETIES, CLUBS, THEATRES. The Missouri Historical Society, the Academy of Science, the Medical Society, the Liederkranz Society, and the Young Men's Christian Association are prominent among the many permanent organizations formed for other than social or business purposes. The German Turner and musical societies are important and are characteristic of influences which have affected the city. The principal clubs are the Saint Louis, the Mercantile, the University, the Noonday, the Marquette, the Columbia, the Country, the Office Men's (social), and others which, like the Commercial, are organized for business rather than social intercourse. There are also the Business Men's League, the Civic Federation, the Saint Louis Spanish Club, the Interstate Commercial Club, and the Manufacturers' Association. Saint Louis has in addition several permanent political clubs occupying their own buildings.

The principal theatres are the Olympic, the Grand Opera House, the Century, the Imperial, the Crawford (Fourteenth Street), and the Columbia. The Grand Opera House has a seating capacity of 2200, and the Olympic 2400.

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COMMERCE AND INDUSTRY. The railroad systems of which Saint Louis is a centre converge here from all parts of the United States and also from Mexico and Canada, though the country in which the city has fostered railroad development most in marketing its output lies south of Nebraska and west of the Mississippi. The twenty-four railroads of which it is a terminus have dwarfed the influence of the Mississippi as the determining factor of its trade without lessening the great advantage of direct river communication with tide water. The total annual shipments by rail and river were 11,159,848 tons for 1902. The total freight received, including coal imported for home consumption, reached 18,477,729 tons. With a capital and surplus of $87,267,173, the banks and trust companies reported annual clearings of $2,506,804,320 for 1902.

Though Saint Louis is important as a manufacturing city and markets its own industrial output, it is still more important commercially as a distributing centre for products representing the entire country. Its location makes it a point of clearing between manufactured products and the products of the soil for which they are exchanged. Its average annual receipts of grain are 70,437,000 bushels; cotton, 766,000 bales; cattle, 1,181,000 head; hogs, 1,494,000 head; coal, 5,648,000 tons; lead, 2,007,000 pigs; zinc and spelter, 2,357,000 slabs; hides, 56,237,000 pounds; wool, 26,378,000 pounds. The principal items of its annual sales (in millions of dollars) are: Dry goods, 120; groceries, 75; boots and shoes, 50; tobacco and cigars, 41; shelf and heavy hardware, 35; woodenware, 10; lumber, 40; candy, 4; beer, 18; clothing, 7; furniture, etc., 33; agricultural machinery and vehicles, 20; iron, steel, and wagon materials, 15; electrical machinery and supplies, 30; drugs and druggists' sundries, 40; glass, glassware, and queensware, 5; terra-cotta and clay products and brick, 5; stoves and ranges, 3; paints and oils, 6; hats and caps and gloves, 5; saddlery and harness, 5. The figures in dollars given above for tobacco represent a gross volume of 83,593,000 pounds and support the claim of the city as 'the largest tobacco market in the world.'

The total number of manufacturing establishments in Saint Louis in the census year (1900) was 6732, with a capital of $162,179,000 and an annual product of $233,629,000. The most important items were manufactured products of tobacco, meat products, malt liquors, newspapers, books and periodicals, clothing, boots and shoes, brick and stone, railroad cars, bakery products, wagons and carriages, flour and grist-mill products, millinery, iron and steel, and furniture. The minimum annual output represented in any one of these lines is $3,000,000; the maximum (for manufactured tobacco) is $24,500,000. These figures do not include the manufacturing activities of the city's suburbs, both in Missouri and Illinois. East Saint Louis, the principal industrial suburb on the Illinois side of the river, is connected by the magnificent Eads Bridge for railroads, wagons, and foot passengers. (See BRIDGE.) The Merchants' Bridge connecting the Illinois terminals of Saint Louis railroads with the Union Station system of terminals is for railroads only. The Union Station covers about eleven acres of ground with its main buildings and adjacent sheds.

Saint Louis is a port of entry. Its exports are chiefly to Mexico, South America, and the West Indies. Its direct trade with the Philippines, mainly in malt liquors, has assumed some importance. The principal export shipments of flour and grain are to Central and South America, Cuba, England, Scotland, Ireland, Holland, and Germany. Exports to Europe consist largely of provisions. The principal items are dry-salt and sweet pickled meats, oleo, lard, and hides. Exports of agricultural supplies, hardware, electrical supplies, machinery, glass, etc., are mostly to Spanish America. The direct imports through the Saint Louis custom house were $4,712,000 for the calendar year 1902.

ADMINISTRATION AND MUNICIPAL ACTIVITIES. Saint Louis has the combined administrative machinery of city and county. The municipal government is vested in a bicameral legislative body with local (ward) representation through the House of Delegates and more general representation through the Council, or Upper House; and in an executive department, consisting of the mayor and the departments under him. The heads of the more important departments are chosen by popular vote, the power to appoint heads of departments being left to the mayor only in those considered of less importance. The sheriff, coroner, civil and criminal courts, and police represent the county system. The police are not subject to the mayor, who has, however, the power of appointing justices for the city or police courts. Under the 'metropolitan system,' final control of the police is vested in the Governor of the State, but it is exercised through local commissioners of his appointment. The expense of this virtually independent department is paid on its own estimates from the city treasury. The management of the public schools through an elective school board is also independent of the mayor and the departments under him.

Direct control of public utilities extends only to the water-supply system, streets and sewers, public parks, and schools. The income from franchises in 1902 was $205,000, out of total receipts of $9,261,000, of which $6,581,000 were from taxes and licenses, and $1,756,565 from water rates. The net expense of maintaining the water service, exclusive of extensions, etc., was $537,136. The disbursements for all purposes were $8,470,000, including $1,200,000 for public debt; $1,623,000 for police; $870,000 for the health department and the various public charities under it; $765,401 for the fire department; $585,000 for public lighting; $438,720 for maintaining and improving streets; $374,350 for the courts; $180,000 for prisons; $165,000 for elections and registration; and $115,000 for parks. The bonded debt of the city, including new indebtedness incurred for the promotion of the Louisiana Purchase Exposition, reaches $23,916,000. The total value of property as assessed for taxation is $418,046,000.

The sewer system includes 530 miles of completed sewers, costing $12,024,000. The waterworks have a capacity of 120,000,000 gallons daily, while the daily consumption is less than 70,000,000. The electric wires already below the surface occupy about 170 miles of conduits. The street railroads, with a single-track mileage of 337, carry in average years more than 145,000,000 passengers.

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The public charities comprise a city dispensary, city hospital, insane asylum, female hospital, poorhouse, and house of refuge, the last-named institution serving the double purpose of prison and reform school for youthful delinquents. A juvenile court for dealing with these offenders was introduced in 1903. The Missouri School for the Blind is maintained at the expense of the State, with none of the features either of an asylum or a reformatory. The city health department includes a department of experimental bacteriology, which serves in tracing and checking germ diseases, and in the care of the water supply.

At the close of the fiscal year 1902 the city had 451.5 miles of paved streets, of which 249.53 miles were paved with macadam and the rest with granite, asphalt, telford, brick and brick-block, etc. Of the total mileage of streets, reported as 884.16 (1902), there were still unpaved 432.66 miles.

POPULATION. The population was, in 1880, 350,518; in 1890, 451,770; in 1900, 575,238. From 1810, the date of the first Federal census, to 1880, the totals include with the city of Saint Louis the population of Saint Louis County, which in 1880 was separately enumerated at 31,888. The population of city and county prior to 1880 was as follows: 1810, 5667; 1820, 10,049; 1830, 14,125; 1840, 35,979; 1850, 104,978; 1860, 190,524; 1870, 351,189. The population of the town itself was, in 1799, 925; 1810, 1400; 1820, 4000; 1830, 4977; 1840, 16,469; 1850, 77,860; 1860, 185,587; 1870, 310,864.

The great growth between 1840 and 1850 had for one of its causes the German emigration following the revolutionary movement of 1848. This influence has been continuous. In 1900, 58,781 out of the total of 111,356 foreign-born residents of the city were natives of the German Empire. This was 52.8 per cent., exclusive of Austrians of German race. In 1900, 17.4 per cent. of the foreign-born population was of Irish nativity, 5.02 per cent. of English, and 4.03 of Russian. In that year Italy, Austria, Bohemia, and Poland had each less than three per cent. of the total of foreign-born residents. Although the total of foreign-born is comparatively small, the native population born of white foreign parents is 239,170, the native population born of native white parents being 189,251. The total colored population, including Chinese, was 25,853.

HISTORY. In 1764 Auguste Chouteau, then only fifteen years of age, acting under orders from Pierre Laclède Ligueste, established a fur-trading station at Saint Louis, and later in the same year Ligueste himself arrived and laid out a town which he predicted would become one of the largest cities in the country. At first called 'Laclède's Village,' the place soon was named Saint Louis in honor of Louis IX. of France. In 1762, by secret treaty, France had ceded all her territory west of the Mississippi to Spain, but the latter did not take possession until 1770, when Saint Louis became the capital of 'Upper Louisiana,' and Lieutenant-Governor Don Pedro Piernas took possession with a small body of Spanish troops. At that time the population was about 500. Though Spain continued in possession until 1803, the town remained essentially French. On May 26, 1780, a large force of Indians, instigated by the English, attacked the place, but did comparatively little damage, though this year was afterwards known locally as 'L'année du grand coup.' In 1803 'Louisiana' was formally retroceded to France in pursuance of the Treaty of San Ildefonso (1800), but several months later the United States came into possession by virtue of the 'Louisiana Purchase' (q.v.). After this, immigration from the Eastern States was rapid, and Saint Louis increased greatly in size and importance. The first newspaper began publication in 1808, and in 1809 the town was incorporated. With the appearance of the first steamboat in 1815 a new epoch began for Saint Louis. John Jacob Astor opened here the 'Western Branch of the American Fur Company' in 1819, and the annual shipments soon amounted to $200,000. Saint Louis was chartered as a city in 1822, though its exceptionally rapid progress did not begin until about ten years later. In 1849 a fire destroyed property valued at $3,000,000, and an epidemic of cholera caused the deaths of 4000 of the 64,000 inhabitants. During the Civil War the sympathies of perhaps the majority of the people were with the South, and here in 1861 began the contest between the Unionists and the Secessionists for the control of Missouri. The Louisiana Purchase Exposition, which was to have been held here in 1903 to commemorate the acquisition of 'Louisiana' from France in 1803, was postponed to 1904. See SAINT LOUIS WORLD'S FAIR.

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SAINT LOUIS, ORDER OF. A French military order of merit with three classes, founded by Louis XIV. in 1693, dissolved during the Revolution, restored by Louis XVIII., and finally extinguished in 1830. The decoration, a white eight-pointed cross with lilies in the angles, bore the image of Saint Louis and the inscription *Lud. Magn. inst. 1693.* On the reverse was a flaming sword with the inscription *Bellicæ Virtutis Præmium.*

SAINT LOUIS, UNIVERSITY OF. A Roman Catholic institution under Jesuit control, in Saint Louis, Mo., established in 1829. It comprises the following departments: College, academy, commercial, military science, philosophy, medical, and science, medicine, and divinity, with a total enrollment in 1902 of 864 students, and a faculty of 106. The buildings are valued at $900,000, the whole value of the college property being about $1,200,000. In the same year the endowment was $184,000, and the income $42,150. The library contains about 43,000 volumes.

SAINT LOUIS WORLD'S FAIR. An international exposition, in Saint Louis, Mo., beginning April 30, 1904, and having for its object the cele-

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bration of the hundredth anniversary of the acquisition of the Louisiana Territory by the United States. On June 4, 1900, Congress promised the sum of five million dollars toward the holding of such an exposition, on condition that an additional ten million dollars be raised by Saint Louis, and in April, 1901, the Louisiana Purchase Exposition Company was incorporated with a capital of six million dollars. In June the site of the exposition was fixed at Forest Park, a tract of 1142 acres of well-worked forest land within the city limits, and including about 110 acres belonging to Washington University, which, with its buildings, were leased to the Exposition Company. The architectural plan provided for fifteen large exhibition buildings, the main group of which was arranged in the form of a fan. The apex of the fan was formed by the Art Palaces, three massive buildings to remain after the exhibition, of which the central one was designed as a memorial building. Other notable structures with their dimensions were: The Electricity Building, 750 by 525 feet; the Varied Industries Building, 1200 by 525 feet, with a tower 400 feet high; the Machinery Building, 750 by 525 feet; the Transportation Building, 1500 by 525 feet; the Textiles Building, 750 by 520 feet; the Manufactures Building, 1200 by 525 feet; the Mines and Metallurgy and the Liberal Arts buildings, each 750 by 525 feet; and the Government Building, 800 by 175 feet. Thirty-four States and Territories made appropriations amounting to more than $4,500,000, part of which was expended in special buildings. Foreign governments also were largely represented, and many of them erected special and typical structures; as, for instance, France, which reproduced the Petit Trianon of Versailles. The administrative system of the Exposition included four executive divisions: Exhibits, Exploitation, Works, and Concessions and Admission. The Division of Exhibits comprised the following fifteen departments: Education, Art, Liberal Arts, Manufactures, Machinery, Electricity, Transportation, Agriculture, Horticulture, Forestry, Mining and Metallurgy, Fish and Game, Anthropology, Special Economy, and Physical Culture. The formal dedication occurred on April 30, 1903.

SAINT LUCIA, lōō-sē'ä. The largest of the British Windward Islands, West Indies. It is situated 25 miles north of Saint Vincent and about the same distance south of Martinique (Map: West Indies, R 8). Area, 233 square miles. The island is volcanic and mountainous, with an active volcanic peak over 3000 feet high. The rainfall is abundant, and the mountains are covered with luxuriant tropical forests. The chief agricultural products are sugar, cocoa, logwood, coffee, and spices. By reason of the exceptionally good harbor at Castries, Saint Lucia has more shipping than any other British West Indian island, except Jamaica, which it nearly equals. The entries and clearings in 1901 amounted to 1,864,720 tons. Population, in 1891, 42,220; in 1901, 50,237, chiefly negroes. Capital, Castries (q.v.). Saint Lucia was discovered in 1502 and colonized by the French in 1563. It changed hands between England and France a number of times, until it became permanently a British possession in 1803. In 1898 it suffered severely from a hurricane.

SAINT LUKE, The Academy of (Accademia di San Luca). The academy of the fine arts at Rome. In the later Middle Ages there was a guild of painters at Rome, whose sanctuary was the small Church of San Luca, on the Esquiline. It first appears on record in 1478, when it renewed and revised its ancient statutes, and assumed the name "Università delle Belle Arti." The present academy, organized after the plans of the painter Muziano, was first recognized in a brief of Gregory XIII. in 1517, its immediate recognition having been prevented by the opposition of the elder society, which it finally absorbed. Under Sixtus V. Federigo Zuccari obtained a bull (1588) approving the new organization, which was placed under the patronage of Saint Luke, and endowing it with the revenues of the Church of San Martino, the name of which was changed to Santi Martino e Luca. The inauguration was postponed till November 14, 1593, under Clement VIII. The academy owed much to Zuccari, its first prince, who left it his fortune. In 1700 Clement XI. instituted and endowed the annual prizes of painting, sculpture, and architecture. The constitution of the academy was but slightly modified until 1818. At the head stood a prince, appointed annually, and this office was held by some of the most celebrated artists, like Maratta, Lebrun, and Canova. In 1818 Pius VII., following the advice of Canova, granted a new constitution, which has not been materially changed since the annexation of Rome to the Kingdom of Italy in 1870.

There are thirty-six academicians, chosen in equal numbers from among the painters, sculptors, and architects, besides foreign and honorary members; at the head of the academy is a president, elected annually. It also maintains a school of design, in which instruction in painting, sculpture, and architecture is given. Besides its private endowment, the academy receives a subsidy of 35,000 francs from the State. It has retained its quarters in the Via Bonella, near the Forum Romanum, where are located its schools and its valuable collection of paintings. The latter contains good examples of Gaspard Poussin, Claude Lorrain, Titian, Veronese, Salvator Rosa, Guido Reni, and the much-discussed "Saint Luke Painting the Madonna," formerly attributed to Raphael. The academy also possesses a small collection of sculpture, presented by the artists, and the valuable Biblioteca Sarti, presented in 1881. It has been of great influence and celebrity, the French and English academies having been modeled upon it. Consult Armand, *L'académie de Saint Luc à Rome* (Rome, 1866).

SAINT LUKE, Guilds of. Mediæval associations of painters, under the patronage of Saint Luke, formed to protect the interests of their members. Engravers, printers, and members of other occupations related to bookmaking were later received into the guilds, which had a long existence in Holland and flourished particularly in Antwerp.

SAINT-MALO, săn'mȧ'lō'. A seaport and the capital of an arrondissement in the Department of Ille-et-Vilaine, France, 51 miles north by west of Rennes; at the mouth of the Rance River, on the English Channel (Map: France, D 3). It is attractively situated on a rocky peninsula, and with its narrow winding streets and sixteenth-century ramparts has a very pic-

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turesque appearance. A rolling bridge (Pont Roulant) connects Saint-Malo with the suburb of Saint-Servan across the harbor. The fifteenth-century parish church, a former cathedral, the fourteenth-century castle, the casino, museum, and library are noteworthy features. The town carries on a considerable trade in agricultural produce, coal, and lumber, has large codfishing interests in connection with Newfoundland, and regular steamship communication with the Channel Islands and Southampton. Shipbuilding and iron-working are also important industries. Population, in 1901, 11,486. Saint-Malo received its name from Saint Malo, a Welsh monk, who came here in the sixth century. It was at the zenith of its prosperity in the seventeenth and eighteenth centuries, when its traders amassed vast wealth as the result of their commercial and privateering ventures. The English attempted at various times to capture the town, but were unsuccessful. The tomb of Chateaubriand is on the island of Grand-Bey, a short distance from the town.

SAINT MARC, săn märk. The capital town of the Department of Artibonite, Haiti, forty-five miles northwest of Port-au-Prince, on Saint Marc Bay (Map: Antilles, L 5). Its chief export is coffee. Its municipal population is reported to be 20,000.

SAINT-MARC GIRARDIN, săn'märk' zhē'-rär'dăn', FRANÇOIS AUGUSTE (known as MARC GIRARDIN) (1801-73). A French author and journalist, born in Paris. He obtained a professorship in the Collège Louis-le-Grand in 1827 and in the same year began his long political and literary connection with the *Journal des Débats*. He was elected to the Chamber of Deputies in 1834, and took a prominent part in framing and securing the passage of the bill for secondary education in 1837, and upon his reëlection to the Chamber in the same year was made a member of the Royal Council of Public Instruction. He retired from political life after the Revolution of 1848, and until 1871 gave himself up almost entirely to literary work. In the latter year he was returned to the National Assembly, elected vice-president, and became an active supporter of the policy of Thiers. Saint-Marc Girardin lectured on literature at the Sorbonne for more than thirty years. He published numerous works on history and literature, among which are, *Tableau de la marche et des progrès de la littérature française au XVIième siècle* (1828); *Cours de la littérature dramatique ou de l'usage des passions dans le drame* (1843); *Essais de littérature et de morale* (1845); *La Fontaine et les fabulistes* (1867); *La chute du Second Empire* (1874); and *J. J. Rousseau, sa vie et ses ouvrages* (1875). Consult Tamisier, *Saint-Marc Girardin, étude littéraire* (1876).

SAINT MARK'S CHURCH (SAN MARCO) in Venice. Originally the chapel attached to the palace of the Doge and the national sanctuary of the Venetians, but since 1807 the Cathedral of Venice. It derives its name from the patron saint of Venice, the Apostle Mark, whose reputed relics were transported from Alexandria to Venice in 828. The church was built in the ninth century, and rebuilt after a conflagration in the tenth. It was a simple Romanesque structure of brick, nearly of its modern plan, though without so extensive a narthex, but adorned with lines of colored brick and brick set in patterns, here and there; a very simple church in the form of a Greek cross with five low cupolas. In the eleventh century there began a series of alterations tending to make the church still more Oriental than it was originally. The low brick cupolas were covered and roofed by lofty domes of wood covered with metal; the mosaic decoration of the interior was carried much further; parts of the walls within were sheathed with slabs of alabaster; the decoration by incrusted marbles and mosaics was carried into the exterior; and finally in the Gothic period (fifteenth century) the pinnacles, the crockets, and other florid adornment of the exterior were added. The result is the church as we have it to-day, the most splendid piece of polychromatic architecture in Europe, and more splendid even than Saint Sophia at Constantinople in its present condition.

The church is about two hundred and fifty feet long, east and west, including the great narthex, and one hundred and seventy feet from north to south over the transepts, and the small porches which, whether open or not, complete the arms of the cross. The west front has five great porches opening upon the Piazza di San Marco, and each porch so deep that the continuous flat roof above them affords a very ample balcony. The famous bronze horses which are supposed to have been brought from Constantinople and to be of antique make are set above the central porch. Of these five porches three are open, and on entering one of those doorways the visitor finds himself in the great narthex. This, in its complete extent, surrounds the western arm of the cross, that which would be the nave in an ordinary Western Romanesque church; but of the three vestibules or arms so made, one is occupied in part by the Baptistery and in part by the chapel called the Cappella Zen. The narthex is vaulted low, underneath a gallery which opens into the church; and these vaults so near the eye are covered with mosaics with many parts of the Bible history. Most of these are of early time, twelfth and thirteenth centuries, but immediately over the main doorway leading into the church is a magnificent Saint Mark from drawings by Titian.

On entering the church the impression is again that of a low and not impressive interior. Everything is near to the eye; the mosaics of the high vaults can be easily made out, although the church is not brightly lighted by day and is still more dim by night. It is, however, full of beautiful details, and these are combined with singular skill and singular good fortune to produce one of the most beautiful interiors in the world. Even when the styles differ widely, and disagreement or even discordant effects might be expected, the result is harmonious and pleasant to the eye. The high screen of the choir with a flight of steps leading to it; the row of statues which crowns this screen; the ciborium behind it, under which is the high altar, and behind which is to be seen at certain times the famous *pala d'oro*, an altar-screen of Byzantine work in silver, silver-gilt, enamel, and precious stones; the alabaster columns and sheathings of the walls, the shrines and side altars in other parts of the church; the deli-

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cate low relief of Byzantine style which fronts the parapet of the balconies and sometimes is incrusted in the walls; the very beautiful pulpits and font; and above all, the splendid harmony of color upon a ground of broken and varied gilding, the surface being made up of small tesseræ, which are in different planes and reflect the light at different angles—all go to produce a result the most consummate that we can point to, of architectural effect produced by colored light and shade, with but little reference to the traditional proportions of any recognized style.

Besides the church proper, there are several minor chapels other than those mentioned, and on the south there is a very remarkable sacristy, to which is attached the famous treasury of Saint Mark's, which contains a precious collection of church plate, jeweled book-bindings, and other artistic treasures of the early Middle Ages. Consult: Ruskin, *The Stones of Venice* (London, 1851-53; reprint 1886); id., *Saint Mark's Rest* (Orpington, 1877-79); Hare, *Venice* (London, 1884); Boito, *The Basilica of Saint Mark in Venice*, trans. by Scott (Venice, 1888); and Kreutz and Ongania, *La Basilica di San Marco* (Venice, 1881-88), one of the most sumptuous publications, consisting of numerous photographs and chromo-lithographs on a large scale.

SAINT MARTIN, săn mär'tăn'. An island of the Lesser Antilles, situated 180 miles east of Porto Rico (Map: West Indies, Q 5). Area, 37 square miles. It is mountainous and destitute of forests and scantily watered, though it produces and exports some sugar, cotton, and tobacco. It belongs partly to France and partly to the Netherlands. Population, 1900.

SAINT-MARTIN, ALEXIS. See BEAUMONT, WILLIAM.

SAINT-MARTIN, LOUIS CLAUDE DE (1743-1803). A French mystic, who wrote under the pseudonym "Ph. Inc." or "Philosophe inconnu." He was born at Amboise; studied law and practiced at Tours; then entered the army, and for a time was stationed at Bordeaux. There Martinez Pasqualis began to influence him with his mystic laws of numbers, and, having come under Swedenborg's sway soon after, Saint-Martin left the army. His *Erreurs et vérité* (1782) presents Pasqualis's doctrine for the most part, while the *Nouvel homme* (1792) is tinged with the mysticism of Böhme, several of whose works Saint-Martin turned into French. The modern Martinists bear his name. Consult: Matter, *Saint-Martin, le philosophe inconnu* (Paris, 1864); Claassen, *Saint-Martin* (Stuttgart, 1891).

SAINT MARY AND ALL SAINTS, LINCOLN. See LINCOLN COLLEGE.

SAINT MARY LE BOW, or BOW CHURCH. A church on Cheapside, London, dating from the second half of the seventeenth century. It was built from Wren's designs on the site of an earlier church, supported by stone arches, whence its name. The lofty spire, 235 feet in height, contains the famous Bow Bells, which called Dick Whittington to return.

SAINT MARYS. A city in Auglaize County, Ohio, 22 miles southwest of Lima; on the Miami and Erie Canal, and on the Lake Erie and Western and the Toledo and Ohio Central railroads (Map: Ohio, B 4). Near the city is a reservoir containing 17,600 acres, which supplies water for the Miami and Erie Canal. Saint Marys is primarily an industrial centre, its chief establishments including machine shops, woolen mills, and manufactories of vehicle wheels, lumber products, chains, strawboard, paper boxes, plate glass, pumps and air compressors, and flour. The government is administered by a mayor and a unicameral council. The waterworks and the electric light plant are owned and operated by the municipality. Population, in 1890, 3000; in 1900, 5359.

SAINT MARY'S RIVER. The channel connecting Lake Superior with Lake Huron. It flows 40 miles southeastward on the boundary between the upper peninsula of Michigan and the Canadian Province of Ontario (Map: Michigan, J 2). It is divided by several large islands into two main channels, each of which has lake-like expansions from 2 to 10 miles wide. It falls 20 feet. Most of this descent occurs at the Saint Mary's Rapids, about one mile long, near the upper end. Transportation around the rapids was at first accomplished by a tramway along the Michigan shore, but this method was replaced in 1855 by a ship canal with locks built at a cost of $1,000,000. (For illustration, see CANAL.) This was enlarged and improved by the United States Government in 1870-81 at a cost of $2,150,000, and again further enlarged in 1889-96 at a cost of $5,000,000. On the other side of the rapids a similar canal has been built by the Canadian Government. The volume of traffic passing through these canals is enormous, greatly exceeding in gross tonnage that of the Suez Canal. See GREAT LAKES.

SAINT MARY'S SEMINARY. A Roman Catholic institution in Baltimore, Md., established in 1791 by the Society of Saint Sulpice. It is a branch of the seminary established by the society in Paris in accordance with the decree of the Council of Trent. There are two departments, philosophy and theology—the former leading to the degrees of B.A. and M.A., the latter to the degree of Bachelor of Theology. The courses cover two and three years. The library contains about 31,000 volumes. The attendance in 1902 was 235, and the faculty numbered 15.

SAINT MAUR, CONGREGATION OF. See BENEDICTINES.

SAINT MAURICE (mô'rēs') **RIVER.** A northern tributary of the Saint Lawrence River, Canada, 300 miles long. It rises in Lake Oskelanaio and enters the Saint Lawrence River at the city of Three Rivers, 9 miles above Lake Saint Peter (Map: Quebec, D 4). It is navigable near its mouth, and again for 75 miles between Grand Piles and the Hudson Bay station of La Tuque. It affords transportation for an extensive lumber region.

SAINT MICHAEL, mī'kel. A village and port of entry in the Northern District of Alaska, 125 miles southeast of Nome; on the island of Saint Michael, in Norton Sound (Map: Alaska, C 3). It has steamship connection with Seattle, Wash. The village is the military headquarters of the Department of Alaska, and has considerable commercial importance as a shipping point for the Yukon mining district. Saint Michael

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VENICE
PIAZZA, ST. MARK'S, AND CAMPANILE

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was founded in 1833. Population, in 1890, 101; in 1900, 857.

SAINT MICHAEL, ORDER OF. (1) A French order, founded in 1469 by Louis XI., with 36 knights, afterwards greatly extended. Louis XIV. restricted the membership to noble families. The order ceased about 1830. Its motto was "Immensi Terror Oceani." The decoration was an eight-pointed cross with fleurs-de-lys, the medallion bearing a representation of the Archangel Michael and the Dragon. (2) A Bavarian order founded in 1693 by Elector Joseph Clement of Cologne, Duke of Bavaria. It was instituted to uphold the Catholic faith, but in 1837 became an order of merit. The decoration is an eight-pointed cross of blue enamel, bearing the image of Saint Michael, with a shield inscribed *Quis ut Deus*. The four arms of the cross bear the letters P. F. F. P. (*Principi Fidelis Favere Patriam*).

SAINT MICHAEL AND SAINT GEORGE, ORDER OF. A British military and civil order of merit with three classes, founded by George III. in 1818. It was intended to commemorate the acquisition of Malta and was designed originally for British residents of the Mediterranean regions. The cross of the order, of white enamel, shows the Archangel Michael with the device *Auspicium melioris ævi;* on the reverse is an image of Saint George. See Plate of ORDERS.

SAINT MICHAEL'S, mĭ'kelz (SÃO MIGUEL). The largest and most important of the Azores (q.v.), and, with the exception of Saint Mary's (Santa Maria), the most eastern island in the group (Map: Spain, B 5). Area, 299 square miles. The island is mountainous, and rises in its highest summit to 3560 feet. There is an extensive export trade in wine, oranges, tea, and pottery. Population, in 1900, 125,183. Chief city, Ponta Delgada (q.v.).

SAINT MICHAEL'S MOUNT. A conical and isolated granite rock in Mount's Bay, Cornwall, England, 18 miles west of Falmouth. It communicates with the shore by a causeway 400 yards long, which is uncovered at low tide. The mount is 230 feet high, is about one mile in circumference, and is crowned by an old and picturesque abbatial castle, restored, and now used as a manorial residence. At the base of the mount is a small fishing village. Saint Michael was the British Dinsol and the Roman Ictis, and at an early period became the seat of a religious house. At the Conquest the Monastery of Saint Michael was annexed to the Abbey of Mont-Saint-Michel (q.v.) in Normandy, its more distinguished prototype. It long remained in the possession of the monks, but since 1660 has belonged to the Saint Aubyn family.

SAINT MORITZ. A watering place in the Upper Engadine, in the Grisons, Switzerland, 11 miles northeast of Maloja. It is frequented both as a summer and winter resort. Altitude, 6,033 feet; population, in 1900, 1578. It is just north of the Lake of Saint Moritz, and is the highest village in the Engadine. The views are beautiful. The Baths of Saint Moritz, situated about a mile to the south, with an elevation of about 5,823 feet, are among the best known in Switzerland. The waters contain alkaline salts and carbonic acid. There is a fine Kurhaus. The fame of Saint Moritz dates from 1589, when Paracelsus called notice to the excellence of its waters.

SAINT-NAZAIRE, săn'nȧ'zâr'. A seaport and the capital of an arrondissement in the Department of Loire-Inférieure, France, 40 miles west of Nantes, at the mouth of the Loire River (Map: France, D 4). It has steamship connection with Newhaven and South American ports. The harbor is spacious and has undergone extensive improvements. Saint-Nazaire is primarily a commercial city. The value of its trade in 1900 aggregated $6,096,000, including exports to the amount of $3,488,000. Farm and garden produce, fruit, wine, and silk and woolen goods constitute the leading shipments. The industrial interests are represented by iron foundries, ship-building yards, and flour and lumber mills. Population, in 1901, 35,813.

SAINT NICOLAS, nē'kō'lȧ'. A town in the Province of East Flanders, Belgium, 13 miles west-southwest of Antwerp (Map: Belgium, C 3). It stands in the midst of the Pays de Waes, a densely peopled and productive agricultural district. A market is held in the great square of the town, one of the largest in Belgium. The manufactures include woolen and cotton goods, pins, lace, hosiery, etc. Population, in 1900, 30,484.

SAINT O'LAF, ORDER OF. A Norwegian order of merit, founded in 1847 by Oscar I. of Sweden. The decoration is a white cross bearing the Norwegian arms on a red ground, with the device *Ret og Sandhed* (Right and Truth) on the reverse.

SAINT-OMER, săn'tō'mâr'. The capital of an arrondissement in the Department of Pas-de-Calais, France, 25 miles southeast of Calais, on the Aa River and the Neuf-Fossé Canal (Map: France, J 1). Its most interesting feature is the Church of Notre Dame, a thirteenth-century Gothic edifice. It has four portals, one of which is embellished with a Last Judgment. Other places of interest in the town include the ruins of the old Benedictine abbey, the Coste Military Hospital, occupying the site of an early Jesuit college, the Collège Saint Bertin, the Church of the Holy Sepulchre, and the museum. The commercial advantages have been greatly increased by the hydraulic lift in the Neuf-Fossé Canal. Considerable trade is carried on in manufactured articles, comprising pipes, paper, flour, liquors, hosiery, and textiles, and in farm and garden produce. Saint-Omer owes its origin to the churches and monasteries founded here in the seventh century by Omer, Bishop of Thérouanne, and other ecclesiasts. Population, in 1901, 20,687.

SAINTON-DOLBY, săn'tŏn dŏl'bĭ, CHARLOTTE HELEN (1821-85). An English vocalist and composer, born in London. She studied at the Royal Academy of Music under Crivelli, and from her début in 1841 to her retirement in 1870 was considered the leading oratorio and ballad singer in England, possessing a contralto voice of marvelous strength and beauty. She married the celebrated violinist Prosper Sainton in 1860. Among the many cantatas composed by her, perhaps the most popular was *The Story of a Faithful Soul,* which was produced in London, 1879.

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SAINTONGE, săn'tŏnzh'. A former province of Western France, now included within the Department of Charente-Inférieure (q.v.). Its capital was Saintes. See Map of France showing former provinces, under FRANCE.

SAINT-OUEN, săn'tōō'ăn'. A suburb of Paris on the right bank of the Seine, one mile north of the city walls (Map: Paris and Vicinity). It has a famous race course in the former park of the Château of Saint-Ouen, where Louis XVIII., in May, 1814, signed the famous declaration promising a charter to France. Saint-Ouen has educational institutions, and is important for its manufactures of firearms, glass, sugar, perfumery, india-rubber, tinned foods, and varnish. There are extensive docks along the Seine. Population, in 1901, 35,436.

SAINT PAN'CRAS. A northern borough of London (q.v.), England, west of Regent's Park. It is a fashionable district; within its limits is Saint Pancras Station, the important terminus of the Midland Railway. The parish church in Euston Square, built in 1819, is a reproduction of the Erechtheum at Athens. Population of borough, in 1891, 234,379; in 1901, 234,912.

SAINT PAT'RICK, MOST ILLUSTRIOUS ORDER OF. An Irish order of merit founded by George III. in 1783 and consisting of the sovereign, the Lord Lieutenant of Ireland, who is grand master, and 22 knights companions of noble rank, in addition to a number of princes of the blood. The badge is a white oval shield showing the cross of Saint Patrick with a shamrock and three golden crowns. The motto is *Quis Separabit*. The ribbon is blue.

SAINT-PAUL, săn'pôl'. A seaport on the northwestern coast of the French island of Réunion (q.v.), situated about 10 miles southwest of Saint-Denis. It is a good place of anchorage and contains a foundry, barracks, a college for priests, etc. Population, about 20,000.

SAINT PAUL. The capital of Minnesota and the county-seat of Ramsey County, situated on the Mississippi, just below Fort Snelling, at the mouth of the Minnesota River (Map: Minnesota, F 6). It is about nine miles below the Falls of Saint Anthony, reckoning from the City Hall, and about seven miles from the celebrated Minnehaha Falls. It is at the foot of the rapids and practically at the head of navigation, about 2300 miles from the mouth of the Mississippi. This point was naturally a trade centre in pioneer days. It tapped the great fur-bearing region through the Minnesota River, thus becoming an important station of the Hudson's Bay Company, and it was a natural depot for supplies brought up by river boats, and for produce taken back. This river traffic gave Saint Paul its first impetus as a centre of trade and transportation, just as the water-power of the falls a little farther up stream made Minneapolis preeminently a manufacturing point.

Saint Paul is picturesquely situated. Rising from both shores of the Mississippi 676 feet above sea level at low water, it extends over a series of terraces to the hills, from 100 to 200 feet higher. The first level on the left bank of the river is occupied by the Union Station, railroad yards and terminals, wholesale houses, and factories; on the second level are the retail stores, public buildings, and hotels; and crowning the upper terrace are the principal residential streets. Similarly on the right bank the first level is taken up by railroad yards and manufacturing plants; higher up are some retail business blocks, and then comes the residential section. The two banks are now connected by three fine wagon bridges and two railway bridges. Three more bridges span the Mississippi at Saint Paul, one at Fort Snelling, and two farther up connecting with Minneapolis. There is a splendid system of street railways operated by electricity generated mostly at the falls in Minneapolis. The lines in the two cities are operated practically as one system. Two double-track interurban routes join the network in the two cities, and a single line runs to Wildwood and Stillwater.

The city embraces an area of about 56 square miles. Of this area 1,204.42 acres, in 48 separate tracts, are devoted to park purposes. The largest and most beautiful is Como Park, between the Twin Cities, with an area of 415 acres, 142 of which are occupied by the pretty Lake Como. Como Park has a close rival in the Indian Mounds Park on the banks of the Mississippi below the city. Here on a bluff 200 feet high are several conical mounds, the summits of which command a view of the river as it sweeps by in a majestic curve. The park systems of the Twin Cities are connected by drives extending along the magnificent wooded gorge and the series of rapids below the Falls of Saint Anthony.

Saint Paul has numerous striking buildings. The finest is the new State Capitol, of white Georgia marble, standing on a lofty eminence. It has a magnificent dome and entrances. The new Post-Office, opposite Rice Park, and the massive City Hall and Court House, occupying an entire square on Wabasha and Fourth streets, are other edifices of merit. This city was among the first to construct tall, massive office buildings, good examples of which are the Pioneer Press, Germania Life Insurance, New York Life Insurance, Gilfillan Block, the Manhattan, and Endicott buildings. Among other fine structures may be mentioned the Ryan Hotel, Newspaper Row, Capital Bank, and Crescent Creamery Company's building.

There are three free libraries: the City Library, of 54,550 volumes; the State Law Library, of 30,000 volumes; and the State Historical Library, with 70,000 volumes and a complete file of newspapers for Minnesota. The Agricultural College of the State University, with its model farm of 243 acres, and the Minnesota State Fair, are at Saint Anthony Park. There are, besides these public educational institutions, many private schools and colleges, among which are Hamline University (Methodist), Macalester College (Presbyterian), College of Saint Thomas and Saint Paul Seminary (Catholic), Concordia College (German Lutheran), Saint Paul's College (German Methodist), and two Lutheran seminaries.

COMMERCE AND INDUSTRY. Saint Paul is a great railroad centre. Twenty trunk lines operated in ten systems furnish transportation for the vast traffic going through the city. The steamboat business has shrunk to very small proportions, even the rafting of logs and lumber having fallen off greatly with the denudation of the northern pine forests. The Great Northern, Northern Pacific, and Chicago, Saint Paul, Minneapolis and Omaha roads have large repair

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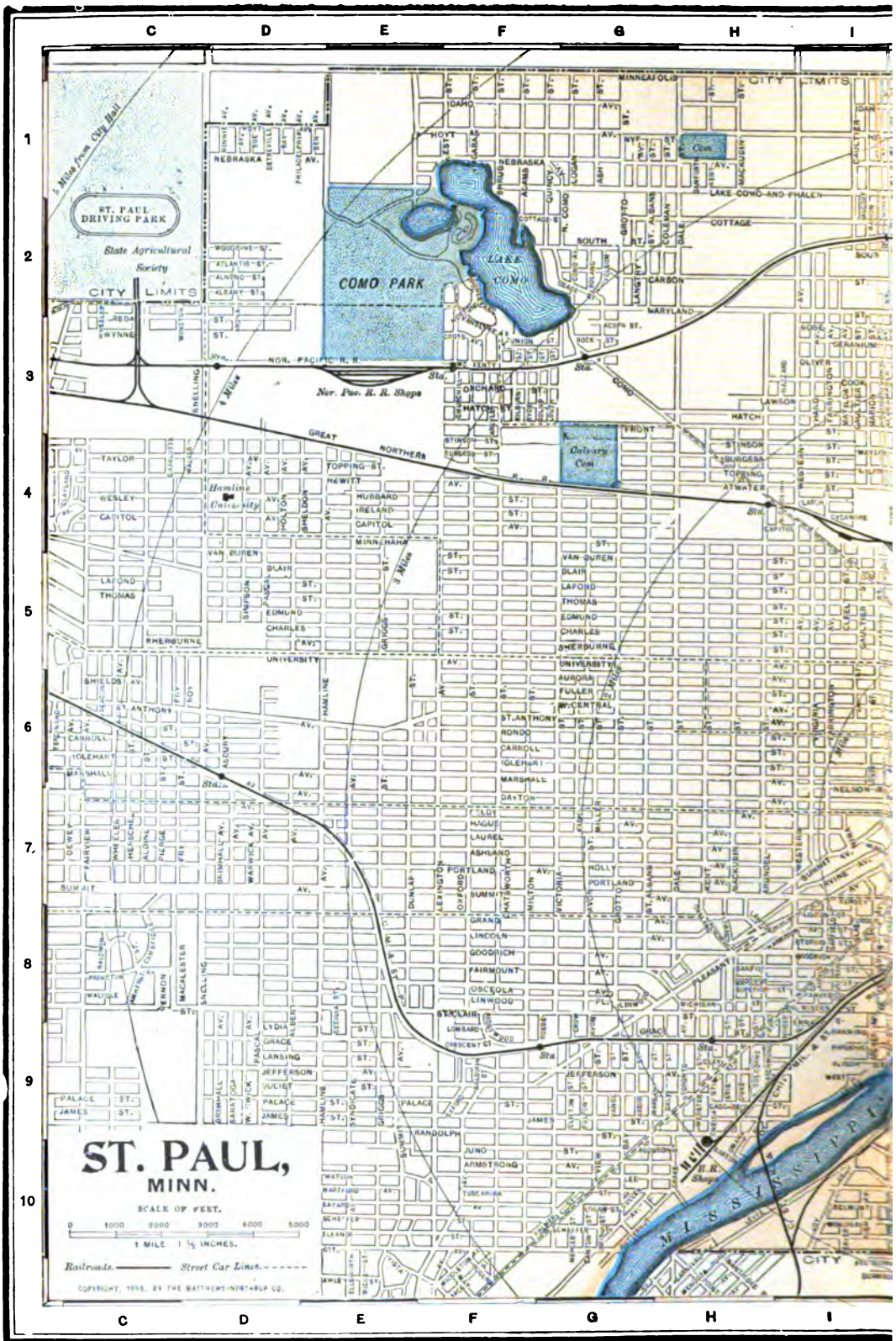

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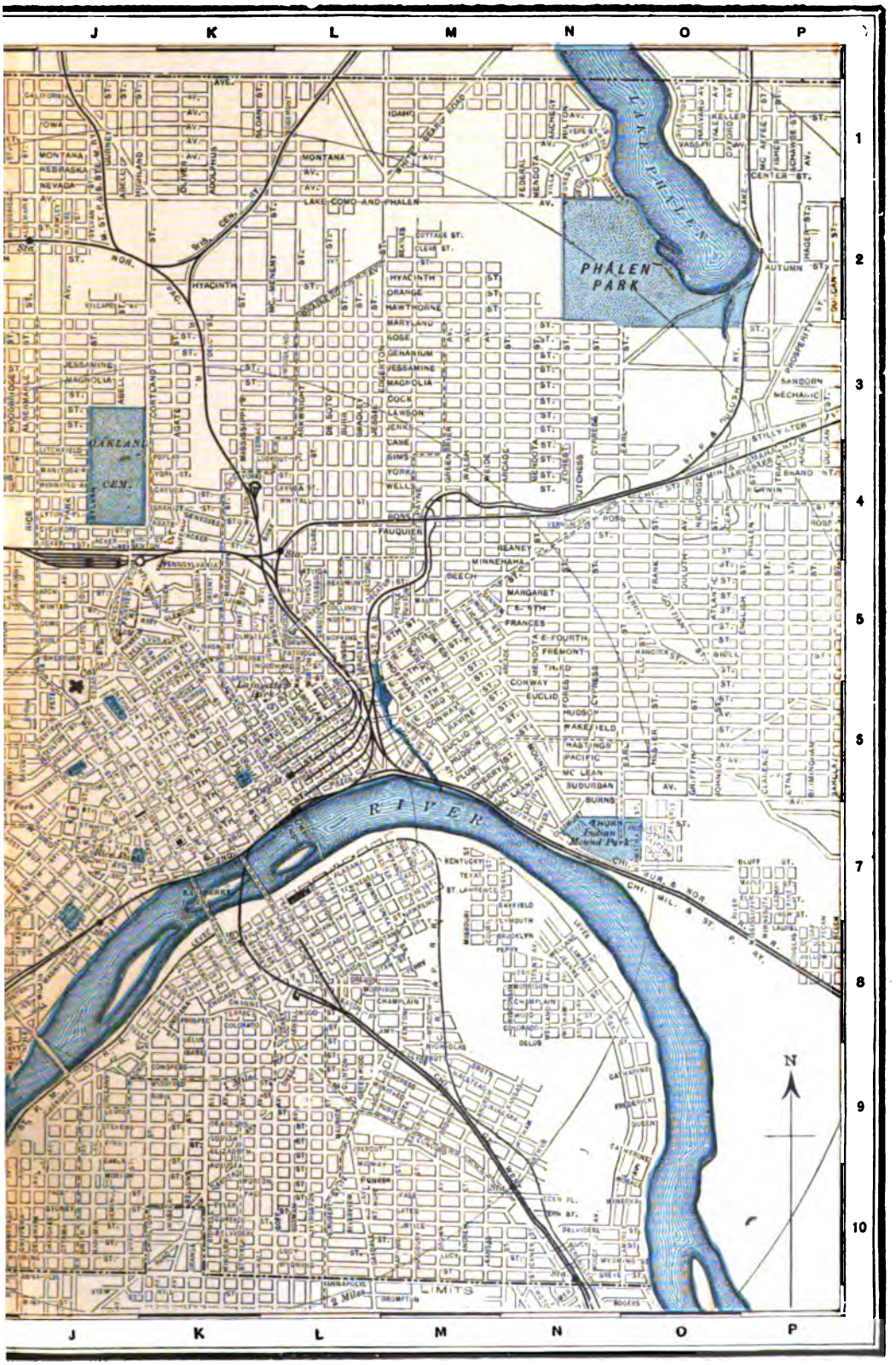

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shops here, these and the smaller shops of four other roads employing about 2500 men. Saint Paul is most important as a wholesale and jobbing centre, but it also has large manufacturing interests, ranking second among the cities of the State. It leads in the manufacture of boots and shoes, and of men's clothing. Among the large establishments are publishing houses, breweries, foundries and machine shops, and fur houses. In the census year of 1900 the various industries were capitalized at $28,208,389, and had an output valued at $38,541,030.

GOVERNMENT. Under a home rule provision inserted in the State Constitution in 1898, allowing all cities to frame their own charters through a commission of 15 freeholders appointed by the District Court, Saint Paul adopted a new charter in 1900. This kept the board plan which had been found to suit the city's needs. The council is bicameral, consisting of an assembly of nine members elected at large, and a board of eleven aldermen, chosen by wards, one from each. The city elections occur on the first Tuesday in May of the even-numbered years, when the voters choose a mayor, treasurer, comptroller, four justices of the peace, three constables, and the members of the council. At every other election, beginning with 1902, two municipal judges also are elected. The city departments are in charge of nine appointive boards: water-works, parks, police, fire, workhouse, public works, almshouse and hospitals, education, and library. The first five have five members each appointed by the mayor for five-year terms, one member going out of office each year, and are not paid. The two following are paid, there being three members on each board, one appointed by the mayor every year. The board of education has seven members, serving without pay for three years, being appointed by the mayor in rotation. The library board consists of nine members, who serve without pay, three being appointed by the District Court every year. The boards have as a rule entire charge of their respective departments. The council fixes the aggregate amount which each may spend annually, and beyond this no board can go. The mayor has, besides his large appointive powers, a veto on all acts of the council, which may be overruled on ordinary matters by a two-thirds vote in each Chamber; in matters requiring a two-thirds vote to pass, by a four-fifths vote; and on a measure to bond the city not to be ratified by the people, it is final.

The water-works were constructed in 1870 and acquired by the city in 1880 at a cost of $4,049,-854. Their value is now estimated at $6,000,000. The water comes from a chain of spring-fed lakes on the high land north of the city, and is distributed through 252 miles of mains. The city has also an excellent sewer system, 176 miles in length, an efficient system of food and health inspection, two hospitals, and public baths.

FINANCE. The bonded debt on January 1, 1903, was $7,878,100, and the floating debt $1,674,-042.50. The sinking fund was $664,039.73. Real estate was assessed at $73,799,715, and personalty at $16,289,440, making a total of $90,089,-155. The tax rate was $31.00 per thousand. The total receipts from all sources for 1902 were $5,263,470.98, while the disbursements were $4,-861,260.78, leaving a cash balance of $402,201.20 on January 1, 1903.

POPULATION. Saint Paul has had an extraordinary growth. In 1850 there were 1112 inhabitants; in 1860, 10,401; in 1870, 20,030; in 1880, 41,473; in 1890, 133,156; and in 1900, 163,065. The census of 1900 showed the foreign population to be 28.7 per cent. of the total, distributed as follows: German, 27 per cent. of the total foreign born; Swedish, 21 per cent.; Irish, 10.4 per cent.; and the remainder distributed among 20 other nationalities. As many as 72.6 per cent. of Saint Paul's population were children of foreigners. Only 2263 were negroes.

HISTORY. Saint Paul derived its name from a rude log chapel erected near the corner of Third and Minnesota Streets, in 1841, by Father Lucien Galtier, a Catholic missionary sent here by Bishop Loras of Dubuque, who had visited the place in 1839. Previously the site had been known as Imnijiska, the Indian for 'White Rock,' also Saint Peter, from the river at whose mouth it stood, now called the Minnesota. It also bore the name of 'Pig's Eye,' after a certain evil-eyed French voyageur and border ruffian who erected a hut on the site in 1838 and engaged in selling spirits surreptitiously to the Indians and to the soldiers at the fort. The first steamboat visited Fort Snelling in 1823, bringing the Indian agent, Captain Taliaferro. In the next three years no less than fifteen steamers visited the place. The land was opened for settlement in 1837, and the following year Edward Phalen, William Evans, and John Hays, three discharged soldiers from the fort, took up claims in what is now the heart of the city. In 1848 Minnesota was cut from Wisconsin and left without a government. The settlers at Saint Paul called a meeting to assemble at Stillwater, and there it was agreed to ask Congress for a Territorial organization, and a compact was made giving Saint Paul the capital, Stillwater the prison, and Saint Anthony, now East Minneapolis, the university. Saint Paul received its first charter from the Territorial Legislature in 1854, its population then being 3000. Three years later the first constitutional convention met here to draft the present Constitution. Consult: Andrews, *History of Saint Paul* (Syracuse, 1890); Williams, *A History of Saint Paul and of Ramsey County* (Saint Paul, 1876); and Warner and Foote, *History of Ramsey County and City of Saint Paul* (Minneapolis, 1881).

SAINT PAUL DE LOANDA, de lô-än'dâ, or LOANDA. The capital of the Portuguese West African colony of Angola (q.v.), situated on the coast, in latitude 8° 48′ S. and longitude 13° 13′ E. (Map: Africa, F 5). Its harbor is rendered inaccessible to large vessels by the sandy bar at its mouth. Its climate is unhealthful. The trade, which exceeds $5,000,000 per annum, is greatly facilitated by the railway line which connects Saint Paul with the interior. Population estimated at 10,000, including about 2000 whites.

SAINT PAUL'S CATHEDRAL, in London. The largest and most magnificent of all Protestant churches, and the most notable among English buildings of modern times. The site of the present building was occupied about 610 by a Christian church, probably of wood, dedicated to Saint Paul, which was destroyed by fire in 1087. From its ruins arose a much more splendid edifice—the immediate precursor of the present cathedral, and commonly known as 'Old Saint

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Paul's.' In 1139 the building suffered severely from fire, but was soon restored with greater magnificence, not finally completed till the latter part of the century. Old Saint Paul's was the largest church in the country, and the cloister was 90 feet square, with a beautiful chapter-house in the centre.

In 1666 the great fire of London destroyed the old cathedral, which had twice previously suffered serious damage from lightning and had fallen into dilapidation. Sir Christopher Wren (q.v.) was at first directed to arrange for the repair of the ruined cathedral, but he opposed this course, and it was finally decided to abandon the effort and to clear away the site. The design at first prepared by the architect was disapproved by the clergy, and Wren was finally compelled to prepare a new design more nearly resembling Old Saint Paul's in plan, and this design, having been approved by King Charles II., was carried out, though with many changes of detail. The edifice was begun in 1675 and completed in 1710 under Queen Anne, during Wren's lifetime.

The design thus executed was a compromise, and most of its defects arise from the incompatibility of the mediæval plan forced upon the architect, with its excessive length and small bays, and the Italian or classical style of architecture in which it was carried out. In spite of all defects, however, it is a noble edifice and one of the finest creations of modern times. The spacious rotunda, as wide as the nave and side-aisles together, well suited to accommodate a vast congregation, rests on eight piers, and as many arches alternately of 38 and 22 feet span. It is in the treatment of the smaller or intermediate arches that the chief infelicity of the interior architecture is found, two superposed arches taking up the vertical space occupied by one of the larger arches, but in a manner exceedingly awkward and unsatisfactory. The nearly equal length of nave and choir prevents alike the impression of a long unbroken vista, and of a predominantly central domical structure to which all else is subordinated. The total length is 490 feet; the internal width across the three aisles is 94 feet; the transepts are 240 feet over all (not including their columnar porches); the dome is internally 108 feet in diameter and 216 feet high to the lunette at the crown. Externally the dome is 370 feet high to the summit of the cross.

The constructive skill displayed is of the highest order; particularly bold was the conception of the brick core which envelops the inner cupola and rises high above it to support the stone lantern which crowns the edifice. The inward contraction of the drum, devised partly for structural, partly for artistic reasons, is less successful. The outer shell of the dome is of wood, covered with lead. The effect of this dome is particularly successful, and it is admitted to be one of the finest in existence. It is the earliest example of a dome with a free-standing peristyle around the drum, later imitated in the Pantheon at Paris. The west front, as seen from Ludgate Hill, is most striking; the two campaniles group most harmoniously with the dome, and, together with the portico, produce a most pleasing and remarkable effect. This front is, however, open to criticism, as is also the second story of the flank of the exterior design. Both appear to indicate an upper story where there is none, and the actual construction and true form of the building are not expressed at all.

Saint Paul's is the burial-place of many heroes and men of distinction, whose tombs are in the crypt, and whose monuments adorn the interior of the cathedral. Among these are Nelson and Wellington, Collingwood, Moore, Howe, and many other celebrated soldiers and sailors; Reynolds, Barry, Opie, West, Sir Christopher Wren, and other distinguished civilians. The style of many of these monuments displays those faults of ostentation and theatrical effect which are common in the sepulchral art of the eighteenth century, but a few among them show genuine artistic merit. Consult: Milman, *Annals of Saint Paul's Cathedral* (London, 1868); Simpson, *Saint Paul's Cathedral and Old City Life* (ib., 1895); Birch, *London Churches of the Seventeenth and Eighteenth Centuries* (ib., 1896); and Dimock, *Handbook of Saint Paul's Cathedral* (ib., 1900).

SAINT PAUL'S SCHOOL. A noted public school in London, England. It was founded in 1509 by John Colet, Dean of Saint Paul's. The first schoolhouse was erected in Saint Paul's churchyard and was destroyed by fire in 1666. It has since been rebuilt, in 1674, and again in 1824. In 1884 new school buildings were erected at West Kensington, a suburb of London, on 16 acres of ground. The school now has an attendance of over 600 boys, taught by 34 masters. The governors offer four exhibitions every year, ranging from £30 to £80, each tenable for four years at the universities of Oxford and Cambridge, and one of £50, at the Royal Academy, Woolwich. In 1900 a scheme for a day school for 400 girls, 39 of whom were to be foundationers, was adopted. Among those who studied at the school were Milton, Judge Jeffreys, the Duke of Marlborough, and Major André.

SAINT PAUL'S SCHOOL. A school for boys at Concord, N. H., incorporated in 1855. The founder was Dr. George C. Shattuck of Boston, who transferred to the trustees his country home with 55 acres of land, near Concord. The first rector was Rev. Henry Augustus Coit, who continued in that position until his death in 1895. The religious teaching and worship are those of the Episcopal Church. Saint Paul's has an active Alumni Association of about 3000, two literary societies, and a missionary society, and maintains a monthly paper, the *Horæ Scholasticæ*, the oldest school paper in the country. The buildings include a fine Gothic chapel, the Sheldon Library, with shelf room for 40,000 books, gymnasium, laboratory, and dormitories. It has athletic fields covering 70 acres suitably equipped. In 1903 the students numbered 332, and the library contained 16,000 volumes.

SAINT PETER. A city and the county-seat of Nicollet County, Minn., 75 miles southwest of Minneapolis; on the Minnesota River, and on the Chicago and Northwestern Railroad (Map: Minnesota, E 6). It is the seat of Gustavus Adolphus College (Lutheran), opened in 1876, and has a State Hospital for the Insane and a public library. Saint Peter is the commercial centre of an agricultural and lumbering region. Its industrial plants include a flouring mill, furniture factories, shirt and trouser factories, grain elevators, bottling works, woolen mills, etc. The government is vested in a mayor, chosen annually, and a council. The water-works and electric-light plant are

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ST. PAUL'S CATHEDRAL, LONDON

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owned and operated by the municipality. Settled in 1854, Saint Peter was incorporated in 1858 and received a city charter in 1891. Population, in 1890, 3671; in 1900, 4302.

SAINT PETER PORT, commonly SAINT PETER'S. The chief town of Guernsey, Channel Islands (q.v.), defended by Fort George, on an overhanging hill, and by the historic Castle Cornet, built on a rocky islet now connected with the mainland by a breakwater (Map: France, D 2). The town rises in picturesque terraces on the east coast, and from its central position commands fine views of all the Channel Islands and the neighboring French coast. It carries on an important English and foreign trade, especially in locally grown market produce and fruit, and has commodious harbors with floating dock and building yard. The fine parish church is called the cathedral of the Channel Islands. Elizabeth College is a well-known educational establishment, and there are excellent markets, bathing places, parks, esplanades, and a well-equipped public library with museum, art, and technical schools. Population, about 18,000.

SAINT PETERSBURG. A government of Russia, bounded by the Government of Olonetz, Lake Ladoga, and Finland on the north, Novgorod on the east, Pskov on the south, and Lake Peipus, Esthonia, and the Gulf of Finland on the west (Map: Russia, C 3). Area, 17,250 square miles, exclusive of the water area. The surface is mostly low. In the south are many lakes, streams, and marshes. The region is well watered along the boundaries as well as in the interior, the principal rivers being the Narova, the Neva, and the Volkhov. There is also an extensive canal system. (See LADOGA.) The climate is moist and unsteady. The economic activity of the government is influenced greatly by the capital and the numerous summer resorts. The raising of cereals is inferior in importance to the gardening and dairying, and there are few manufacturing industries outside of the capital and Kronstadt. Population, in 1897, 2,107,691, including a considerable number of persons belonging to the Finnic race, besides German colonists, Jews, Poles, and various foreign elements.

SAINT PETERSBURG. The capital of the Russian Empire, situated on the delta of the Neva and at the eastern end of the Gulf of Finland, 400 miles northwest of Moscow (Map: Russia, D 3). The main part of the city lies on the left bank of the river. The remaining portion occupies the numerous islands formed by the arms of the stream. The principal islands are the Vasilyevsky, Peterburgsky, Aptekarsky, Petrovsky, Kamenny, Yelagin, and Krestovsky. All of them are very low and steadily gaining in area owing to the gradual rising of the coast around the Gulf of Finland. The low situation of Saint Petersburg makes it liable to frequent inundations, caused usually by strong western winds, which prevent the discharge of the waters of the Neva. The construction of canals and the granite embankments have greatly alleviated the situation. The Neva and its arms and tributaries are spanned by numerous bridges, of which the most prominent are the Troitsky, the Alexander, the Palace, and the Nicholas.

The climate is very changeable, and on the whole unpleasant. The severe periods of cold during the winter are varied by warm westerly gales, which raise the mean temperature above that of Moscow. The summers are hot and short, and the autumns are usually cold and damp. The mean temperature is about 15° F. in winter and about 65° in summer. The percentage of cloudiness is nearly 70.

TOPOGRAPHY. The main part of the city, on the left bank of the Neva, is regularly laid out in modern European style. Along the river are situated palaces and costly private residences, as well as the imposing Admiralty, surrounded by a beautiful garden. From the Admiralty, which stands in the centre of the city, radiate three long avenues: the splendid and fashionable Nevsky Prospect, the Voznessensky Prospect, and the Gorokhovaya Street. The principal squares of this part of Saint Petersburg are the Senate Square, with the famous equestrian statue of Peter the Great erected by Catharine II. in 1782; the Palace Square, with the Alexander Column—a great monolith of red granite, surmounted by the figure of an angel; and the Field of Mars, an immense parading ground embellished with a statue of Suvaroff. The pretentious monument to Catharine II. stands in front of the Anitchkoff Palace, and the equestrian statue of Nicholas I. in front of the Mariynsky Palace. In its architecture Saint Petersburg presents few striking features, although some of its palaces and churches are imposing in appearance.

The impressive Cathedral of Saint Isaac (1768-1858) is built in the shape of a Greek cross with gilded cupolas, magnificent peristyles, and fine columns of porphyry, malachite, and lapis-lazuli. Other prominent churches are the Cathedral of Our Lady of Kazan (1801-11), an imitation of Saint Peter's, with a richly ornamented interior, and the Cathedral of Saints Peter and Paul (1712-33), in the fortress of the same name, and containing the remains of the Russian monarchs since the time of Peter the Great; and the Alexander Nevsky Monastery in the eastern part of the city, the burial place of many of the most prominent literary men, composers, and artists of Russia.

Of the well-known palaces of Saint Petersburg (some of which contain extensive art treasures), the most notable is the Winter Palace—a vast structure of mixed style, facing the Neva. It dates from the reign of the Empress Elizabeth (1741-62), and was rebuilt after the fire of 1837. It contains a number of magnificent halls, decorated with war trophies, portraits of famous generals, and historical paintings. Other interesting palaces are the Anitchkoff, the residence of the heir apparent, the Mikhailovsky, the Marble Palace, and the Taurida Palace, built by Catharine II. for Potemkin. Noteworthy public buildings besides the Admiralty are the General Staff, the Senate, the Gostinny Dvor, and the old Mikhailovsky Palace (now used as a school of engineers).

Connected with the mainland by the Troitsky Bridge is a small island occupied by the renowned fortress of Saints Peter and Paul, the nucleus of the capital and used as a State prison. On the Vasilyevsky Island are the exchange and the most important educational institutions, including the university. The Peterburgsky Island is principally a residential section. The Aptekarsky Island has magnificent

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botanical gardens. The remaining islands are covered with numerous parks and private gardens, and have many summer residences. There are also a number of summer resorts along the right bank of the Neva, while the mainland north of the main arm of the Neva is occupied by industrial establishments and workingmen's dwellings.

Saint Petersburg has a unique system of markets and trading centres, in which nearly all of the retail trading is carried on. There are twelve of the former and two of the latter, all belonging to the city and constituting a source of profit to the municipal treasury. In the two trading centres called Gostinny Dvor and Apraxine Dvor, well known all over Russia, clothing and footwear are chiefly sold. In the markets all sorts of foodstuffs constitute the chief article of trade.

Educational Institutions, Collections, and Charities. Saint Petersburg is the intellectual centre of Russia. It is more influenced by Western civilization than any other part of Russia. Besides the university (see Saint Petersburg, University of) there are the Technological Institute, the Military Academy of Medicine, the Military Academy of Law, the Nicholas Military Academy, the institutes of forestry, mining, and civil engineering, the Imperial Historico-Philological Institute, the Alexander Lyceum, the Greek Orthodox and Roman Catholic academies, the 'corps of pages,' and the archæological institute.

There are also institutions for the higher education of women in medicine and philosophical and exact sciences. Among the special schools mention should be made of the conservatory of music, founded and directed for some time by Rubinstein. The Imperial Public Library (1,330,000 volumes and some 27,000 manuscripts) is inferior in size only to the Bibliothèque Nationale and the British Museum. Its nucleus is the Zaluski Library, which was seized by Suvaroff at Warsaw in 1794. Other important libraries are those of the Academy of Sciences (about 400,000 volumes and 13,000 manuscripts) and the Asiatic Museum. There are also a number of interesting archives in charge of the Holy Synod and the various Ministries. The Hermitage contains one of the most prominent galleries of paintings in the world. There are about 1700 canvases. The Flemish and Dutch schools (including about 40 Rembrandts), the Spanish collection (with especially the works of Velazquez and Murillo), and the French school, with its Claudes, are richly represented. The Hermitage has also an important collection of sculptures, an extensive collection of Scythian, Greek, Egyptian, Assyrian, and Russian antiquities, collections of engravings and coins, and a valuable library. The Academy of Art contains a valuable array of Russian paintings and works of modern French landscapists. The Alexander III. Museum, opened in 1895, is devoted chiefly to old Christian and old Russian works of art. The most noteworthy of the scientific organizations are the Academy of Sciences, to which are attached the observatories at Pulkova (q.v.) and Vilna, and the botanical gardens, the Russian Geographical Society, with branches in Siberia and the Caucasus, the Russian Historical Society, the Archæological Society, the Physico-Chemical Society, and the Free Economic Society.

There are over 300 philanthropical societies, maintaining more than 600 charitable institutions, including about 150 asylums for children, 90 poorhouses, and about 100 dispensaries and nurseries; also model tenements, lodging houses, etc. The hospitals are maintained mostly by the central Government and the municipality.

Commerce and Industry. The capital forms with its suburbs one of the largest manufacturing centres of Russia, being inferior only to the industrial region of Moscow. Of special importance are the textile, metal, and rubber industries. Important also are the tobacco, leather, and various stone products. In 1898 the large industrial interests were represented by over 90 stock companies, with an annual output of over $100,000,000. These, however, indicate only a part of the industrial activity, since there are a very large number of small industrial establishments, engaged mostly in the production of food products, articles of apparel, small metal and wooden wares, leather goods, etc.

In the early part of the nineteenth century Saint Petersburg had over 50 per cent. of the total foreign trade of Russia. During the last quarter of the nineteenth century the total trade of Saint Petersburg absolutely decreased, although the imports show a considerable absolute increase. For the two years of 1883 and 1898, for instance, the exports amounted approximately to $62,000,000 and $47,000,000, and the imports to $46,000,000 and $73,000,000 respectively. The principal exports are agricultural and dairy products and lumber; the imports are composed of coal, metals, various foodstuffs, and manufactures. By the construction of the sea canal to Kronstadt the port of Saint Petersburg has been made accessible to the largest vessels. The incoming shipping of these two places in 1899 amounted to over 1,600,000 tons. Only about 5 per cent. of the vessels carried the Russian flag. Saint Petersburg is the strongest financial centre of Russia, and an important one in Europe. Its principal financial concerns are the Imperial Bank, the International Commercial Bank, and the Saint Petersburg Discount Bank.

Administrative and Municipal Functions. The administration is largely in the hands of the central Government. There is, however, a municipal council elected by a very small number (about 7000) of property-owners for four years. The municipality and the central Government own most of the public utilities, including the water-works (which have lately been provided with a filtering plant), the street railway lines, the ferries, docks, and harbors, and the telephone lines. The street cleaning is only done in part by the city, and the sewerage is far from adequate. Electricity is used only to a limited extent. There are as yet no electric or cable street railways. The annual budget balances at over $9,000,000. The revenue is derived principally from taxes on real estate and on business, and from the income on municipal property and undertakings. The principal expenditures are on education, service of the debt, maintenance of public works, and charities.

Population. The population increased very rapidly during the nineteenth century. In 1800 it was 220,000; in 1864, 539,122; in 1897, 1,132,677; and in 1900, 1,248,739. It is now (1903) estimated at over 1,500,000. The suburbs, which are economically dependent on the city, had a

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population of 190,635 in 1900. Some peculiar features of the population are the large proportion of persons born outside of the city (about two-thirds of the total), the excess of the male sex (19.5 per cent. in 1897), and the predominance of the peasant class, which constituted over one-half of the total in 1897. The Russians form about 90 per cent. of the population. The death rate was 27 per thousand in 1886-95 and 24 in 1897. The percentage of illegitimate births is very great (27.7 per cent.).

HISTORY. In 1300 the Swedes founded at the mouth of the Neva the settlement of Landskrona, which was destroyed by Novgorod (q.v.) in the following year. During the fourteenth century a number of settlements were founded along the river by Novgorod. The territory remained in the possession of that city and later of Moscow until the seventeenth century, when the Swedes succeeded in recovering the region around the mouth of the Neva, and founded the town of Nyön; at the junction of the Okhta with that river, and the fortress of Nyönschanz on the opposite shore, In 1703 the fortress was taken by Peter the Great, who in the same year laid the foundations of the fortress of Saints Peter and Paul, the nucleus of the future capital. The foundation of Saint Petersburg marked a revolution in the history of Russia, as it signalized the definite assumption by that Empire of a place among the Baltic Powers, and its entrance upon the stage of Western politics. With his usual directness and energy Peter I. divided the supervision of the work of building the city between himself and his lieutenants, and by 1712 sufficient advance had been made to permit the transfer of the royal family from Moscow. Thousands of peasants were ordered from the rural districts to the new capital, and a special tax was imposed to meet the expenses. A scarcity of masons was met by an order forbidding the erection of stone buildings throughout the rest of the Empire, and all proprietors of over 500 serfs were compelled to build residences in the new capital and spend the winter season there. During the reigns of Catharine I. and Peter II. the Russian population of the capital decreased considerably. Anna Ivanovna revived many of the measures of Peter I., and Elizabeth Petrovna, following the policy of her predecessor, greatly increased the population of the capital and added much to its architectural beauty. Catharine II. also took great interest in the growth of Saint Petersburg, and enriched it by many beautiful palaces, some of them intended for her favorites.

Consult: Hafferberg, *Petersburg in seiner Vergangenheit und Gegenwart* (Saint Petersburg, 1866); Elaroff, *Saint-Petersbourg et ses environs* (ib., 1892).

SAINT PETERSBURG, DECLARATION OF. An agreement between the Great Powers by which harsh conditions of war were to be mitigated. In December, 1868, a conference of delegates representing Austria-Hungary, Bavaria, Belgium, Denmark, France, Great Britain, Greece, Italy, the Netherlands, Persia, Portugal, the North German Confederation, Russia, Sweden, Norway, Switzerland, Turkey, and Württemberg was held at Saint Petersburg, upon the invitation of the Russian Government, for the purpose of considering the existing rules of war with the view of ameliorating the hardships of warfare. A declaration was agreed upon and signed by the delegates present affirming that the only legitimate object of war should be to weaken the military force of the enemy, which could be sufficiently accomplished by disabling the greatest possible number of men, which object is exceeded by the employment of arms that uselessly aggravate the sufferings of disabled men or render their death inevitable. The employment of such arms was declared to be contrary to the laws of humanity in view, and consequently the signatory Powers agreed to renounce in case of war among themselves the use of any explosive projectile of less weight than 400 grams (14 ounces avoirdupois) or one charged with fulminating or inflammable substances. The United States took no part in this convention, and has never acceded to it.

SAINT PETERSBURG, UNIVERSITY OF. An institution which had its inception in the teachers' institute established under Catharine II., although Peter the Great previously planned the establishment of a university in his new capital. In 1803 the budget for a contemplated university was confirmed by Imperial edict. The teachers' institute was known as the 'Pedagogical Institute' from 1804 to 1816, when it was reorganized as the 'Higher Pedagogical Institute,' with 27 teachers, divided into the sections of philosophy-jurisprudence, physics, mathematics, and history-literature. At the same time it received the right to confer degrees, thus placing it practically on a university basis. In 1819 an Imperial edict transformed the institution into a university. In 1902 the university consisted of the following faculties: (1) History-philology, (2) physics-mathematics, (3) law, and (4) Oriental. The attendance was 3775. The library contained 144,574 volumes, 306,727 pamphlets, and a collection of 9349 manuscripts, including a large number on Chinese literature. The university includes, among other institutes, the Museum of Fine Arts and Antiquities, a large collection of coins, astronomical and meteorological observatories, and a botanical garden.

SAINT PETER'S CHURCH (at Rome). The largest Christian place of worship. It is closely connected with the Palace of the Vatican and in this capacity it has always been used, especially for the great festivities of the Church. The present church succeeded the Basilica of San Pietro in Vaticano, one of the original basilicas of Rome and the largest of all. This is still the official title of the church, and distinguishes it from the other churches in Rome which are dedicated to Saint Peter. The plan and general character of the old basilica are preserved in the drawings engraved for the folio volume prepared to illustrate Bunsen's *Die Basiliken des christlichen Rom* (1843). It was a five-aisled basilica, with a large forecourt or atrium, and a baptistery and some other minor structures attached to the building. During the long residence of the popes at Avignon (1309-1376) the basilica was much defaced and partly ruined, and it appears to have been about 1450 that Pope Nicholas V. undertook the rebuilding in the taste of the time. A design was made by Bernardo Gambarelli, more commonly called Rossellino, but of this design very little was ever put into execution.

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The first pope to take up the work with vigor was Julius II. (1503-1513), who employed Bramante to make an entirely new design for the church. This design is preserved; it includes a great central cupola around which the nave and aisles are grouped. He died in 1514, and his successor as chief architect was Raphael, having as his immediate assistants the able architects Giuliano da San Gallo and Baldassare Peruzzi (qq.v.). It seems that they changed the plan to a Latin cross. In 1546 the work was put into the hands of Michelangelo Buonarroti, who returned to the Greek cross, and followed Bramante's main lines of the work, building upon the great piers of the earlier architect. (See MICHELANGELO.) He carried up the vaults and pendentives and all that even now exists leading up to the great cupola, and he made during his lifetime a model in wood of the cupola itself, which is preserved, and which was very closely followed in the actual construction. Until his death in 1564 Michelangelo controlled the work. The cupola seems to have been completed about 1590 under the direction of Giacomo della Porta and Domenico Fontana. The final dedication of the church was in 1626. The great colonnades inclosing of Piazza di San Pietro, one of the most effective compositions of the late neo-classic style, was carried out by Bernini (q.v.) about the middle of the seventeenth century.

The entrance front, which in this church faces the east instead of the west, as is more usual, had not been carried very far. This unfortunate neglect made it the more easy for Carlo Maderna to undertake his final and most unfortunate changes. Appointed architect in 1605, he returned to the idea of the Latin cross, which always had many friends among the clergy for ritualistic reasons. The addition made in this way to the church is in itself an enormous building. Carlo Maderna's front, on the Piazza di San Pietro, is not at all a fine design; architects of all schools are agreed upon that; but it could be endured as a tolerable piece of the *decadenza*. The serious mischief done is this, that one has to be half a mile from the church in order to see the cupola aright from the east. The great Piazza di San Pietro, about one thousand feet long, does not give nearly sufficient opportunity to retire from the front in order to see the cupola. Thus the most important part of the church can only be seen aright by him who will pass around to the west and northwest of the church and get permission to enter the Papal gardens there. From a point well chosen in that region the huge cupola rises from its substructures, themselves enormous in scale, and the whole group, the mass, the artistic conception embodied in these enormous combinations of cut stone is in its main outlines one of the finest conceptions of modern times.

The interior of the church is disfigured by exaggerated ornamentation and with strong contrast of light and dark. Thus when one enters the church for the first time the most plainly visible thing is apt to be the adornment of the great piers by cartouches, picked out in strong contrast of light and shade on the dark marble surface. In ways like this the great proportions of the building are dwarfed, and to this is to be added the natural acceptance of the classic system of proportion, in which the architectural members are always of the same relative size, so that a single acanthus leaf in the capitals of the nave may be five feet long. The proportions of the interior, though far from perfect, are, on the whole, however, still to be received as in accordance with a fairly rational architectural tradition. The church grows on the spectator continually, and the effect of the great cupola when seen from within is one of the most striking and most charming pieces of architectural decorative work in existence.

The church is crowded with altars, mosaics, tombs, shrines, statues, fonts, and other works of art, insomuch that it forms a museum of the sculpture and the architectural decorative work of three centuries. The most prominent of the accessory structures inside the church is the great bronze Baldacchino, as lofty as most church towers, and covering the high altar. Beneath this is a shrine or confessionary. The crypt has been carefully guarded through all the change of plan and through the centuries of constantly renewed work on the building. It contains many precious monuments and fragments of the original Basilica of Saint Peter, of which it marks the level, ten or twelve feet below that of the modern church. Consult: Geymüller, *Les projets primitifs pour la basilique de Saint Pierre de Rome* (Paris, 1880); De Lorbac, *Saint Pierre de Rome* (ib., 1879); and Letarouilly, *Le Vatican et la basilique de Saint Pierre à Rome* (ib., 1882).

SAINT PETER'S COLLEGE. A college at Cambridge, England, commonly called Peterhouse, the oldest college in the university. It was founded in 1284 by Hugh de Balsham, Bishop of Ely, for a master and fourteen fellows. It was the outgrowth of an attempt by the Bishop to introduce certain secular scholars into the Hospital of Saint John in 1280. This ended in the transfer of those scholars to certain hostels near the Church of Saint Peter, which was impropriated to the new foundation, and gave it the name it bears. (See SAINT JOHN'S COLLEGE.) Peterhouse consists of a master and ten fellows, lecturers, tutors, and officers, honorary fellows, twenty-two scholars, and six exhibitioners, and some sixty undergraduates in all. There are eleven livings in the gift of the college.

SAINT-PIERRE, săn'pē'ăr'. A seaport on the southern coast of the French island of Réunion (q.v.), connected by rail with Saint-Denis, the capital. It has lost its commercial importance since the opening of the Port des Galets, but has a number of sugar mills and canning establishments. Population, 27,520.

SAINT-PIERRE. Previous to 1902 the most important city on the island of Martinique (q.v.), French West Indies (Map: Antilles, R 7). It lay at the head of an open bay on the northwest coast of the island, and at the foot of Mont Pelée. It was an attractive and well-built town, and had a cathedral, a college, a fine botanical garden, a theatre, and several handsome public buildings. The harbor was an open roadstead, but the town had considerable commerce, the exportation of sugar and rum being especially important. The population in 1901 was 26,011.

On May 8, 1902, the entire city and the neighboring hamlets were destroyed by an explosive

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ST. PETER'S CATHEDRAL AND PART OF THE VATICAN
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eruption of Mont Pelée. (For a description of the volcano and the nature of the eruption, see PELÉE, MONT.) As only a few of the inhabitants had taken warning from the activity of the volcano on the preceding days, practically the entire population of the city perished, the number of victims, including those in the surrounding districts, being estimated at 30,000. Only two persons actually in the city at the time of the eruption escaped death, one being a prisoner in the city jail.

SAINT-PIERRE, JACQUES HENRI BERNARDIN DE (1737-1814). A French novelist, essayist, and engineer, born at Havre, and educated at Caen. He made a voyage to Martinique, became an engineer, entered the army, was dismissed for insubordination, and for some years led a wandering life, appearing at Malta, Saint Petersburg, Warsaw, Dresden, and Berlin. In 1765 he went to Paris and essayed literary work, but in 1768 he obtained a Government post in Ile de France, where he remained till 1771. On his return he associated much with Rousseau, on whom he modeled his character and his style. For the rest of his life he remained in France, publishing *Voyage à l'Ile de France* (1773), *Etudes de la nature* (1783-88), *Paul et Virginie* (1787), and *La chaumière indienne* (1790). His *Harmonies de la nature* appeared posthumously. In 1792 he became superintendent of the Botanical Garden of Paris. He was professor of morals at the Normal School in 1794 and became a member of the Institute in 1795. Saint-Pierre's significance lies solely in the realm of imagination and sentiment, which is often childlike, sometimes childish. *Paul et Virginie* came at the right moment. Cloyed with wit, the Parisian literary generation of that time sought refuge in feeling. Saint-Pierre entered into the heritage of the novelist Rousseau, receiving and transmitting more of his romantic sentiment and sympathy with nature than any other. *Paul et Virginie* attempts to realize Rousseau's 'state of nature' in a tropical Arcadia, and the death of the heroine comes just in time to save the idyll of innocent childhood from the sickly sentimentality on whose verge it often hangs trembling. Stylistically, Saint-Pierre's influence has been very great. He was the first in France to treat landscape, with intent, as the background of life. Saint-Pierre's *Works and Correspondence* were edited with a *Life* by Aimé Martin, who married his widow (Paris, 1818-20). Consult: Lescure, *Bernardin de Saint-Pierre* (ib., 1891); Maury, *Etude sur la vie et les œuvres de Bernardin de Saint-Pierre* (ib., 1892); and Arvède Barine, *Bernardin de Saint-Pierre* (ib., 1891, Eng. trans., Chicago, 1893).

SAINT-PIERRE, JACQUES LEGARDEUR DE (1698-1755). A French soldier and explorer, born in Normandy in 1698. He entered the French service as an ensign of marines, and was shortly afterwards sent to Canada. In 1750 he was sent to explore the Northwest and to search for a route to the Pacific. He ascended the Saskatchewan River to a place he called 'Rock Mountain,' and there built Fort La Jonquière. Soon after his return he was ordered to the Ohio Valley region, and in 1754 was commander of Fort Le Bœuf on French Creek. In the following year Saint-Pierre commanded the Indian allies in Dieskau's expedition into New York, and was killed in the battle of Lake George. An account of his explorations in the West, entitled *Journal sommaire du voyage de Jacques Legardeur de Saint-Pierre, chargé de la découverte de la Mer de l'Ouest*, is preserved in the British Museum, and was published in the collection of John Gilmary Shea (New York, 1862). Consult also Parkman, *A Half-Century of Conflict* (Boston, 1892; later ed. 1897).

SAINT-PIERRE AND MIQUELON, mē'ke-lôn'. A French colony, 47 miles off the southern coast of Newfoundland, consisting of the three islands of Saint-Pierre, Ile-aux-Chiens, and Miquelon, with a total area of 93 square miles (Map: Newfoundland, D 6). They are rocky and barren, but are of great importance as the centre of the French cod-fisheries. In 1901 the industry engaged over 3600 persons, and the exports of fish and fish products amounted in the same year to over $2,000,000. The imports nearly equaled the exports. Saint-Pierre, the capital, has cable connection with Europe and America, and regular steam communication with Boston and Halifax. The colony is administered by a Governor and is represented by a Deputy in the French Chamber. Population, in 1897, 6352, including over 700 British subjects. The islands were ceded to Great Britain by France together with Newfoundland in 1713, but were recovered at the conquest of Canada, and after changing hands several times finally returned to France in 1816.

SAINT-POL-DE-LÉON, săn'pôl'de-lā'ôn'. A town in the Department of Finistère, France, half a mile from its port, Rempoul, on the English Channel, and 13½ miles by rail northwest of Morlaix. It is noted for a Romanesque-Gothic cathedral dating from the twelfth century, with two granite spires 180 feet high, and for the fourteenth-century Chapelle de Notre Dame de Creizker, with a fine central tower and spire 252 feet high, and other interesting features. The town was an episcopal see from the sixth century until the suppression of the bishopric in 1790. Population, in 1901, 7846.

SAINT-PORCHAIRE, pôr'shâr', POTTERY OF. A famous ware first examined and recorded about 1830, and entitled 'Faïence Henri Deux,' because of the occurrence in its ornamentation of the letter 'H' and crescents which were supposed to be the badge of Diane de Poitiers. Only about fifty-three pieces are known to exist, of which one or two are in Russia and the remainder are about evenly divided between France and England. The South Kensington Museum and the Louvre Museum, as also the Musée de Cluny in Paris, contain each several perfectly representative specimens.

The peculiarity of the pottery is that its decorations are almost entirely by incrustation, pieces of dark red or dark brown clay inlaid in the yellowish white of the body. The shapes have been cut out by little dies strongly resembling bookbinders' stamps, and after the incrustation has been made, the whole has been brought to a smooth surface and covered with a thin transparent glaze. Enamels are used with great moderation.

SAINT-PRIVAT, prē'vā', BATTLE OF. A name often given to the battle of Gravelotte (q.v.).

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SAINT-QUENTIN, kăn'tăn'. The capital of an arrondissement in the Department of Aisne, France, 95 miles north by east of Paris, on the Somme River (Map: France, K 2). One of the chief attractions of the town is the Church of Saint Quentin, which dates from the twelfth century. It is a Gothic structure, and is especially noted for its highly adorned interior. The Hôtel de Ville, a fourteenth-century edifice, with its curiously constructed council hall, is also noteworthy. Saint-Quentin is of considerable industrial importance and the surrounding region, too, has large manufacturing interests. The leading products are cotton and woolen textiles, sugar, engines, billiard balls, machinery, etc. Population, in 1901, 50,278. The Roman name for Saint-Quentin was Augusta Veromanduorum. It suffered greatly from the attacks of the Northmen during its early history. Here on August 10, 1557, the Spaniards under Emmanuel Philibert of Savoy won a great victory over the French under the Constable de Montmorency, and here, on January 19, 1871, the Prussians administered a crushing defeat to the French under Faidherbe.

SAINT RE'GIS. A settlement of Catholic Iroquois on the south bank of the Saint Lawrence River, on both sides of the boundary line between Canada and the United States, being partly in Huntingdon County, Quebec, and partly in Franklin County, New York. The Iroquois name is Akwesasne. The village was established about the year 1755 by a party of Catholic Iroquois from Caughnawaga, Quebec. Being chiefly of Mohawk descent, the Indians all speak that language. They are expert basket-makers, and neglect farming for that industry, which proves quite remunerative. They number in all about 2500, of whom 1320 are on the Canadian side.

SAINT RO'NAN'S WELL. A novel by Scott (1824), a picture of life at a small watering-place, with Clara Mowbray's tragic story as a background. Its best feature is the character of Meg Dods, the innkeeper.

SAINT-SAËNS, săn'sän', CHARLES CAMILLE (1835—). A French composer, born in Paris. At the age of seven he became a pupil of Stamaty (piano); in 1847 he joined Benoist's class at the Conservatory, and in 1849 won the second and in 1851 the first organ prize. He competed unsuccessfully for the Prix de Rome, but secured the appointment of organist of the Church of Saint Méry (1853), resigning it in 1858 to become organist of the Madeleine. After 1870 he devoted himself entirely to composition, concert, and recital work. His first important compositions were the symphonic poems, *Phaéton*, *Le rouet d'Omphale*, *La jeunesse d'Hercule*, and *La danse macabre*, which last was especially popular. His operas have been the least successful of all his works, although they bear strong evidence of his originality and genius. With Massenet he has shared the reputation of being the most classical French composer of his generation. His instrumentation, which shows the influence of Berlioz, is strikingly brilliant and original. In 1881 he became a member of the Institute. In 1894 he was made a commander of the Legion of Honor. His works include (besides those already mentioned) the operas, *La princesse jaune* (1872); *Le timbre d'argent* (1877); *Samson et Dalila* (1877); *Etienne Marcel* (1879); *Henry VIII.* (1883); *Proserpine* (1887); *Ascanio* (1890); *Phryné* (1893); *Frédégonde* (first three acts by Guiraud, last two by Saint-Saëns, 1895); ballets and incidental music; three symphonies, the one in C minor declared by Lavignac to be the finest example of orchestration ever written; several oratorios, concertos for piano and other instruments, chamber music, songs, and church music.

SAINTS'BURY, GEORGE EDWARD BATEMAN (1845—). An English critic and literary historian, born at Southampton, October 23, 1845; educated at King's College School, London, and at Merton College, Oxford. He was classical master in Elizabeth College, Guernsey (1868-74), and head master of Elgin Educational Institute (1874-76). He settled in London as a journalist and miscellaneous writer (1876-95), and was appointed professor of English literature in the University of Edinburgh (1895). Saintsbury shows a wide knowledge of literature, foreign as well as English, and his judgments, based on sound principles, are expressed in a very readable style. Among his numerous publications are a *Primer of French Literature* (1880); *Dryden*, in "English Men of Letters" (1881); *Short History of French Literature* (1882); *Marlborough* (1885); *Elizabethan Literature* (1887); *Essays in English Literature, 1780-1860* (first series, 1890; second series, 1895); *Essays on French Novelists* (1891); *Nineteenth Century Literature* (1896); *The Flourishing of Romance and the Rise of Allegory* (1897); *Sir Walter Scott* (1897); *A Short History of English Literature* (1898); *Matthew Arnold* (1899); the exhaustive *History of Criticism and Literary Taste in Europe* (1900 et seq.); and *The Earlier Renaissance* (1901).

SAINT-SERVAN, sĕr'văn'. A seaport in the Department of Ille-et-Vilaine, Northern France, less than a mile from Saint Malo (Map: France, E 3). It is mostly a modern town with a handsome town hall and a triangular tower of the seventeenth century. Population, in 1901, 12,597.

SAINTS' EVERLASTING REST, THE. A religious work by Richard Baxter (1650), used by many generations as a devotional book. Its clear and beautiful style, little antiquated by the lapse of two hundred years, and the manly vigor of its piety have made it an English classic.

SAINT-SIMON, săn'sē'môn', CLAUDE HENRI, Count de (1760-1825). A French socialist. He entered the army at sixteen, and came to America, where he served with distinction in the campaign against Cornwallis. On his return to France he was made colonel, but in 1785 he resigned from the military service and traveled extensively in Holland and Spain. He had already conceived his mission in life to be "to study the progress of the human mind in order to work thenceforth for the perfecting of civilization." He took little part in the great Revolution of 1789, but, though a noble himself, voted to abolish titles of nobility. He made a considerable fortune during this period by purchasing the confiscated estates of the émigrés. About this time he contracted a marriage which proved unhappy and was afterwards dissolved. His fortune was soon exhausted by his extravagant mode of living,

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and he was obliged to work as a copyist. Ill health compelled him to give up even the pittance he could earn in this way, and he found himself reduced to a condition of abject poverty. His family finally settled upon him a small pension. In 1823 he attempted suicide. Supported by his friends, he devoted himself again to his propaganda, and succeeded in gaining numerous disciples, the most famous of whom were Augustin Thierry and Auguste Comte. He died in 1825.

The chief doctrines of Saint-Simon are as follows: (1) The rules of science should be applied as rigorously to the study of social facts as to the study of facts of a physical nature. (2) Through true science thus applied, the condition of humanity, and especially of the poorest class, can be improved, mentally, physically, and morally. (3) To industry—the *ensemble* of producers—should be given the political power heretofore held by the proprietary and military classes. (4) Society should be reorganized, taking labor for the basis of the entire hierarchy. (5) To this new society only producers should be admitted, and idleness should be proscribed. "No man has a right to free himself from the law of labor." (6) In this society workers should be rewarded according to merit. (7) Laborers must unite and centralize their social forces in order to attain their common end. (8) The three institutions—religion, the family, property—must all be reorganized upon new bases. These doctrines were further developed by the followers of Saint-Simon into the social philosophy called after its founder Saint-Simonianism. This school of socialism insists especially upon the abolition of the law of inheritance, upon the socialization of the instruments of production, and upon a system of distribution based upon the merits of the individual.

The following are the principal works of Saint-Simon: *Lettre d'un habitant de Genève à ses contemporains* (1802); *Introduction aux travaux scientifiques du XIXème siècle* (1807); *Réorganisation de la société européenne* (1814); *L'industrie, ou discussions politiques, morales et philosophiques* (1817); *Du système industriel* (1821-22); *Catéchisme des industriels* (1822-23); *Opinions littéraires, philosophiques et industrielles* (1825); *Nouveau christianisme; dialogue entre un conservateur et un novateur* (1825); *Exposition de la doctrine de Saint-Simon* (1830-32). His complete works have been collected and comprise 19 of the 47 volumes entitled *Œuvres de Saint-Simon et d'Enfantin* (Paris, 1865-78).

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SAINT-SIMON, LOUIS DE ROUVROY, Duke of (1675-1755). A noted French writer of memoirs. He was carefully trained, entered the army in 1692, resigned his army commission in 1702, and repaired to the Court of Louis at Versailles. He had considerable diplomatic aptitude, and in 1704 he proposed a method of ending the Spanish War of Succession, which formed, in part, the basis for the Treaty of Utrecht. After Louis XIV.'s death (1715) Saint-Simon had a seat in the Council of the Regency, and was instrumental in the degradation of Madame Montespan's sons, the Duke of Maine and his brother (August 26, 1718), an event to which he devotes seventy-seven pages of his *Mémoires*. He was sent in 1721 on an embassy to Madrid to ask the hand of the Infanta for Louis XV. In 1723 he left Versailles for his country seat at La Ferté, near Chartres, where he passed his remaining years. Saint-Simon's *Mémoires*, written from memoranda begun about 1699 and developed into notes (1734-38), were given their final form from 1739 to 1752, and impounded for the Foreign Office in 1761. Charles X. gave the manuscript to General de Saint-Simon, and an edition appeared in 1830, followed by Chéruel's (30 volumes) in 1856, and by Boislisle's final and full edition (30 volumes), begun in 1871. The preliminary notes for the *Mémoires* were made in an interleaved copy of Dangeau's *Journal*, and were printed in 19 volumes in 1854. Other manuscripts of Saint-Simon were locked in the Foreign Office till 1880, when those concerning the Spanish Embassy were printed. Eight more volumes appeared in 1890-92, but the *Mémoires* are alone of striking interest. They are, as Saint-Simon calls them, "straightforward, truthful, candid, inspired with honor and integrity," though often misinformed and distorted by prejudice, for Saint-Simon was a vigorous hater, with a certain puritanic sternness that could grow fierce at the persecution of the Huguenots, pitiful over the sufferings of the peasantry, and bitter over the infamies to which in his view Madame de Maintenon (whom he hated intensely) degraded the Church. He saw behind the sham façade of Louis's grandeur "a reign of blood and brigandage," and he discerned no less clearly the masks of individual character, so that his *Mémoires* afford an inimitable portrait gallery. He writes without art, he is confused, ungrammatical sometimes, yet he makes the reader share in the action as no other memoir-writer has ever done.

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SAINT SOPHIA, CHURCH AND MOSQUE OF. A celebrated structure at Constantinople. The first church of this name was built by the Emperor Constantine, on the occasion of the translation of the seat of empire to Byzantium, and is so called as being dedicated to the *Hagia Sophia* (holy wisdom), or the Logos. The building of Constantine was subsequently rebuilt and enlarged by his son Constantius; this second church of Constantius, having been destroyed in 404, was rebuilt by Theodosius the younger in 415; and it lasted unaltered till the battle of the factions of the circus, under Justinian, in 532, in which year it was totally destroyed. The present building is substantially that which was erected by Justinian in expiation of this sacrilege. It was consecrated in 537, and occupied less than seven years in its erection. Ten thousand workmen are said to have been employed

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upon it. The materials were supplied from every part of the empire, including columns and marbles from pagan monuments. Untold sums were lavished upon its decoration and the sacred furniture with which it was adorned. The church is the masterpiece of Byzantine architecture, and one of the epoch-making buildings of the world. Its architect was Anthemius (q.v.).

The building may be described as a square of 241 feet, forming interiorly a Greek cross, and surrounded in the interior by a woman's choir or gallery, supported by magnificent columns. In the centre rises a dome, supported at the front and back by two great semi-domes, which in their turn rest upon smaller semi-domes, and on the sides by heavy buttresses, the whole presenting a series of unexampled beauty. The height of the dome is 175 feet. The building is approached by a double porch, which is about 100 feet in depth. The whole of the interior was richly decorated with marbles and mosaics. Even in the reign of Justinian, a further reconstruction of the building became necessary, the dome having fallen in in consequence of an earthquake in 558, but this may be said to have been the last important change in the structure within the Christian period of Constantinople.

On the occupation of that city by the Turks in 1453, Saint Sophia was appropriated as a mosque. All its purely Christian fittings and internal structures were swept away. The Christian emblems were either mutilated or covered from view by a coating of plaster. The latter course was adopted throughout the building in the case of mosaic pictures, containing representations of the human figure, which the Koran proscribes as unlawful, and thus the mosaics have in great part escaped destruction. The Sultan Abdul Medjid having ordered a complete restoration of the building, the mosaics were accidentally brought to light, and, with the consent of the Sultan, accurate copies were made of all of these interesting relics of antiquity. The interior of the building at present is restored for Mohammedan worship, the Christian decorations being again carefully covered up. Consult: Salzenburg, *Altchristliche Baudenkmäler Konstantinopels* (Berlin, 1854); Pulgher, *Les anciennes églises byzantines de Constantinople* (Vienna, 1878-80); Adamy, *Architektonik der altchristlichen Zeit* (Hanover, 1884); Lethaby and Swainson, *The Church of Sancta Sophia* (London, 1894); and Barth, "Konstantinopel," in *Berühmte Kunststätten* (Leipzig, 1901).

SAINT STANISLAS, stăn'ĭs-lȧs, ORDER OF. A Russian order of merit, of Polish origin, having been founded by King Stanislas II. in 1765. After the partition of Poland it lapsed, and was restored in 1815 by the Czar Alexander as King of Poland. The decoration is an eight-pointed red enameled cross with gold eagles between the arms. The white medallion is surrounded by laurel and bears the initials S. S. (Sanctus Stanislas).

SAINT STEPHEN, stē'ven, ORDER OF. A royal Hungarian civil order with three classes, founded in 1764 by Maria Theresa. The King of Hungary is the grand master and only nobles are eligible for membership. The decoration, a green enameled cross with the crown of Saint Stephen, has a red medallion on which is a green mountain with a crown bearing a silver apostolic cross, and the inscription, *Publicum meritorium Præmium*. See Plate of ORDERS.

SAINT THOMAS, tŏm'ȧs. An island in the Gulf of Guinea. See SÃO THOMÉ.

SAINT THOMAS. One of the Danish West Indian islands (see WEST INDIES, DANISH), situated 36 miles east of Porto Rico, in latitude 18° 20′ N. and longitude 64° 56′ W. (Map: West Indies, P 5). It is about 13 miles long from east to west and covers an area of 33 square miles. It has a hilly surface, and rises in its highest summit, West Mountain, to an altitude of 1555 feet. The principal formations are porphyry and granite. The climate is hot but steady, and the mean annual temperature is 78° F. Earthquakes are frequent. The economic importance of the islands has disappeared with the abolition of slavery (1848), which was essential to the sugar industry. At present the island produces chiefly rum, and is important on account of its situation, which makes it especially suitable for a coaling station. Population, in 1901, 11,012, mostly descendants of negro slaves. English is the predominant language. Capital, Charlotte Amalie (q.v.). The island was discovered by Columbus in 1493; passed to the Danish West India and Guinea Company in 1671; and was taken over by the Crown in 1754.

SAINT THOMAS. Capital of Elgin County, Ontario, Canada, a railway junction, 15 miles south of London and 75 miles southwest of Hamilton (Map: Ontario, B 5). It has manufactures of various sorts, the most important of which is car-building. Population, in 1901, 11,485.

SAINT-VICTOR, sȧn'vĕk'tōr', PAUL DE (1827-81). A French critic. He replaced Théophile Gautier in 1855 as dramatic and art critic on the *Presse*. After ten years of brilliant work on this paper he wrote for Girardin's *Liberté* (1866-69) and the *Moniteur Universel* (1869-81). His most picturesque effort is *Barbares et bandits* (1871), and his other works, mostly made up of his journalistic writings, include *Hommes et dieux* (1866), his masterpiece; *Les femmes de Goethe* (1869); *Victor Hugo* (1885); *Le théâtre contemporain* (1889); and *Les dieux et les demi-dieux de la peinture* (1863, with Gautier and Houssaye). Consult Deljant, *Paul de Saint-Victor* (Paris, 1887).

SAINT VIN'CENT. An island of the British West Indies, belonging to the colony of the Windward Islands, and situated about 25 miles south of Saint Lucia (Map: West Indies, R 8). It is oval in shape, with an area of 132 square miles. It is of volcanic origin, and traversed from north to south by a ridge or mountain range which rises near the northern end in the active volcano of La Soufrière to a height of 3700 feet. The climate is healthful and equable, the temperature ranging between 90° and 65°. The rainfall is abundant, the mountains are covered with forests, and there are many fertile valleys. The chief products are arrowroot, cocoa, cotton, fruits, and spices. The sugar industry has been steadily declining. Population, in 1891, 41,054; in 1900 (estimated), 44,600, chiefly negroes. The capital is Kingstown (q.v.). Saint Vincent was discovered in 1498 by Columbus. In 1797 most of the native Caribs, who had been left in possession of the island, were transferred to Ruatan in the Gulf of Honduras. The island has re

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THE MOSQUE OF ST. SOPHIA

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cently suffered from two disasters following in rapid succession. In 1898 it was swept by an unusually violent hurricane, and in May, 1902, large parts of it were devastated by the eruption of La Souffrière (q.v.), occurring simultaneously with that of Mont Pelée (q.v.) in Martinique. About one-third of the island was laid waste. Several villages were destroyed, and about 1500 persons were killed.

SAINT VINCENT, CAPE. See CAPE SAINT VINCENT.

SAINT VINCENT, JOHN JERVIS, Earl of. A British admiral. See JERVIS, JOHN.

SAINT VINCENT DE PAUL, sän vän'sän' de pōl, SOCIETY OF. A society of Catholic laymen founded in Paris in 1835 by Frédéric Ozanam (q.v.), with the object of visiting the poor and suffering at their dwellings and dispensing to them relief, promoting the elementary and religious instruction of poor children, distributing moral and religious books, and undertaking any other charitable work to which its resources are adequate. It is entirely unsectarian in its methods of operation. The headquarters are in Paris, where the affairs of the society are administered by a president-general and a council-general. There are other subdivisions of the society, such as the superior council, the central council, and the particular council, each having its sphere of authority strictly defined. The superior council has jurisdiction over countries or sections thereof, into which the society has been introduced; the particular council is subject to the superior council, and generally has supervision over the affairs of a diocese, while the conference has charge of parish work.

SAINT VITUS'S DANCE. See CHOREA.

SAINT VLADIMIR, *Russ. pron.* vlä-dyĕ'-mĕr, ORDER OF. A Russian civil order of merit with four classes, founded by Catharine II. in 1782. The decoration is a red cross with the initial of the saint.

SAINT VLADIMIR, UNIVERSITY OF. See KIEV.

SA'IS (Lat., from Gk. Σάις, Coptic *Sai*). A city of ancient Egypt, on the right bank of the Canopic branch of the Nile, in latitude 30° 57′ N., near the site of the modern village of Sa el-Hager. It was the capital of the Saitic nome, and is mentioned in very early times as the seat of worship of the goddess Neith (q.v.), whom the Greeks identified with Athene. Under the Twenty-sixth Dynasty, founded by Psammetichus I. (q.v.), the city became the capital of Egypt, and was adorned with many splendid buildings. Herodotus speaks with special admiration of a shrine or chapel, hewn from a single block of granite, which Aahmes II. caused to be made near Elephantine and transported to Sais. In the remarkable revival of art, letters, and ancient religious customs which took place under the Twenty-sixth Dynasty, Sais became famous as a centre of culture and as the seat of an important theological school. The *Book of the Dead* (q.v.) seems to have been the subject of special study, and in the Saitic revision of this interesting collection the chapters composing it were for the first time arranged in a fixed order. Under the Ptolemies the city declined in importance, though it was probably an episcopal see in early Christian times. The buildings of the Saitic Pharaohs are now marked by heaps of rubbish, and Mariette's excavations upon the site were unproductive. Consult: Wilkinson, *Manners and Customs of the Ancient Egyptians* (London, 1878); Wiedemann, *Aegyptische Geschichte* (Gotha, 1884-88); Budge, *A History of Egypt* (New York, 1902).

ŚAIVAS, shī'vàz. Worshipers of the Hindu deity Siva (q.v.). They are divided into many sects, most of which represent decadent schools of philosophy. Most of the Yogins, or ascetic philosophers, were and are Śaivas, and the ascetics called *Ūrdhvabāhus* and *Ākāśamukhas* (i.e. those who held up the arms and the face respectively till they became stiff) are usually of this class. On the other hand, many of the so-called Śaivas, such as the *Jāngamas* (Wanderers) and *Daṇḍins* (Staff-bearers), are not necessarily such. In the earliest period there are noticeable two marked tendencies in the Śaiva cult, its democratic disregard of caste and its psychic philosophy. The Śaiva sects have been drawn for the most part from the two extremes of India's social life. The lowest and most unintelligent mendicants, understanding only asceticism, generally belong to this, as do, for the reason just stated, the philosophers; while the rich middle classes, especially those of North India, are followers of Vishnu (q.v.). The Paramahansa, 'highest-soul' Śaivas, are the most spiritual, though the modern representatives are often more conspicuous for nudity and stolidity than for anything else. One of the oldest of the Śaiva sects is that of the Aghoris, cannibals devoted to the most disgusting practices, but known as Śaivas for fifteen centuries. Many of the Śaivas are Śaktas (q.v.). Consult: Wilson, *Sketch of the Religious Sects of the Hindus* (Calcutta, 1846); Barth, *Religions of India* (Boston, 1882); Hopkins, *Religions of India* (ib., 1895).

SAJOUS, sä'zhōō', CHARLES EUCHARISTE (1852—). An American physician, born at sea, off the coast of France. He came to America in 1861, and studied medicine at Jefferson Medical College, Philadelphia. Professor of laryngology at the Pennsylvania School of Anatomy (1880-84), he lectured on the same subject at the clinic of the Jefferson Medical College from 1884 to 1890, but his more important work, beginning in 1888, was as editor-in-chief of the *Annual and Analytical Cyclopædia of Practical Medicine.* In his especial branch, laryngology, Dr. Sajous wrote *Diseases of the Nose and Throat* (1886), and invented several valuable operating tools.

ŚAKA, shä'kà. An important system of reckoning time in India, used over practically the entire country, and the one exclusively employed in astronomical works. According to native tradition it was invented by King Salivahana, also called Saka, in A.D. 78, and the era is consequently sometimes called by his name. It begins, like the Samvat (q.v.) year, on the full moon of the month Chaitra, which corresponds to March-April, is luni-solar in character, and is generally reckoned in expired years, so that the Saka date given represents the year last completed. Christian dates are reduced to Saka by the subtraction of 78 from the Christian year. Consult Sewell and Dikshit, *The Indian Calendar* (London, 1896).

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SAKAI, sä'kī. One of the aboriginal peoples of the Malay Peninsula, regarded by practically all authorities as true 'Negrito' in type. The purest representatives of the stock are found in the interior of the peninsula, particularly in southeastern Perak and northwestern Pahang. Physically the Sakai are undersized, with dolichocephalic skulls, dark brown skins, frizzly or woolly hair, and rather thick lips. They are still nomads, except at a few points on the west coast, where regular relations with the Malays have led to small plantations of rice and sugar cane. Elsewhere they are found in small family groups (mostly two or three families), with patriarchate rule, but copartnership of man and wife on a monogamic basis. Their houses are very primitive in character, and in the regions where tigers abound platforms are built in the trees. The language may be described as monosyllabic with a strong agglutinative tendency, and is divided into several dialects, of which two only are known to any extent. It contains a number of Malay loan-words. Consult: Stevens, *Materialien zur Kenntnis der wilden Stämme auf der Halbinsel Malakka* (Berlin, 1892); Schmidt, *Die Sprachen der Sakei und Semang auf Malacca und ihr Verhältnis zu den Mon-Khmer Sprachen* (The Hague, 1901).

SAKAI, sä'kī'. An important manufacturing city in the Prefecture of Osaka, Japan, situated on Osaka Bay, six miles southwest of Osaka (Map: Japan, D 6). Its chief manufactures include cotton goods, cotton rugs, sake, bricks, cutlery, and cosmetic powders. Population, in 1898, 50,203.

SAKALAVA, sä'kâ-lä'vâ. A negroid people living in a number of tribes in the western part of Madagascar. Physically they closely resemble the Bantu negroes of Africa, but exhibit many results of crossing with the Malay inhabitants of the rest of the island. Their culture also is very similar to that of their African neighbors. The weight of authority is in favor of an African origin of the Sakalava, though some competent investigators regard them as Melanesian immigrants. See MADAGASCAR.

SAKANDERABAD, sâ-kän'dēr-â-bäd'. A town of Hyderabad, India. See SECUNDERABAD.

SAKATA, sâ-kä'tâ. A seaport in the Prefecture of Yamagata, Japan, situated on the western coast of Hondo, about 100 miles south of Akita (Map: Japan, F 4). It has an extensive trade in rice. Population, in 1898, 21,937.

SAKE, sä'kâ. The rice beer of the Japanese. It contains only a small percentage of alcohol, but in some of its forms is very intoxicating through the presence of fusel oil. There are many varieties, differing in strength, color, and flavor. The best comes from the Province of Setsu. Sake is used freely as a beverage, and in the ceremonies connected with Confucianism and Shinto. At elaborate feasts it is customary for the host to drink a cup of sake with each of his guests.

SAKHALIN, sä'kâ-lyēn'. See SAGHALIEN.

SAKI (South American name). A monkey of the South American genus Pithecia, allied to the howlers, but characterized by the inclination forward of the lower incisor teeth, much as in lemurs. They have a thumb and the tail is not prehensile. Associated with them in these characteristics are the Uakari monkeys, which, however, differ greatly in their very short tails and otherwise. Most of them have long, soft hair, which has a wig-like appearance on the head, forms a long, divided beard beneath the chin, and makes the long tail bushy. Five or six species are known, all small, retiring, sober in their behavior, and confined to the valleys of the Amazon and Orinoco. One is the Brazilian 'couxio' (*Pithecia Satanis*), which is everywhere blackish brown; another is the 'couxia,' or red-backed saki (*Pithecia chiropotes*), marked by a large dorsal patch of reddish brown. The best known one, perhaps, is the blackish, 'hairy,' or Humboldt's saki, or 'parauaçu.' It is speckled gray, and has a heavy hood of hair overhanging the face. Consult Bates, *A Naturalist on the Amazon* (London, 2d ed., 1892). See MONKEY; and Plate of AMERICAN MONKEYS.

SAKKARA, sâk-kä'rä. A village of Egypt, noted for its ancient mausolea and pyramids. See SAQQARA.

ŚĀKTAS, shäk'tâz (Skt. *śākta*, worshiper of the divine energy, especially the female principle of divinity, from *śakti*, power). In Hindu religion, the worshipers of any of the female representations of the divine power. In its special and usual sense, the word is applied to the worshiper of the female energy or wife of Siva (q.v.) alone; and the Saktas properly so called are, therefore, the votaries of Durga, or Devi, or Uma. Originally, however, the mother-goddess worshiped by the Saktas has nothing to do with Siva or any other god. She was herself, as Durga, Parvati, Kali, or simply as Great Mother, the matriarchal deity of the Dravidians; but subsequently by the Aryans she was regarded merely as the female principle of an androgynous god. As such, the goddess Sakta, 'female power,' became synonymous with the female principle in life, and the worship of this principle, though sometimes loftily conceived, led to the grossest licentiousness. The works from which the tenets and rites of this religion are derived are known by the collective term of *Tantras* (q.v.), but since in some of these works the ritual enjoined did not comprehend all the impure practices recommended in others, the sect became divided into two leading branches, the *Dakṣiṇācārins* and the *Vāmācārins*, the followers of the right-hand and the left-hand ritual respectively.

The Daksinacarins are the only respectable Saktas. They profess, indeed, to possess a ritual as pure as that of the Vedas. Their priests, however, are not required to know any Veda, and they differ in their practice from the Vedic cult in the method of performing sacrifices. The Vamacarins, on the other hand, adopt a ritual of the grossest impurities. They profess the desire to become one with the deity by means of mystic rites; but in reality these rites are simply orgies of lust, except where the object of the worshiper is to obtain *siddhi*, magical power, in which case recourse is had to mystic formulas at midnight in a cemetery. This worship is not a degeneration, as has sometimes been held. It is a survival of the same primitive mother-worship that once obtained among all the Dravidians as among the Semites. Some Saktas are not Saivas (q.v.), but the majority belong to this class. See SIVA and SAIVAS, with the literature cited under the latter title.

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ŚAKUNTALĀ, shä-kụn'tä-lä. A legendary Hindu nymph. Her name occurs in the *Yajurvēda* (see VEDA) and the *Śatapatha Brāhmaṇa*, she is the subject of an episode of the *Mahābhārata* (q.v.), and is mentioned in the *Purāṇas* (q.v.). She is best known, however, as the heroine of Kalidasa's *Abhijñānaśakuntalā*, or Sakuntala Recognized. The principal features of the legend of Sakuntala, as narrated in the Mahabharata, are the following: She was the daughter of the saint, Viśvamitra, and the Apsaras, or water-nymph, Menaka. Abandoned by her parents, she was adopted by the sage Kanva, who brought her up in his hermitage as his daughter. While King Dushyanta was hunting in the forest, he came by chance to the hut of Kanva, saw Sakuntala, and fell in love with her. He married her and promised her that the son she would bear him should be the heir to his throne, and that he would take her as his queen to his royal city. After the birth of her child, she remained at the hermitage until the boy was six years old; but Dushyanta, unmindful of his promise, did not send for her. Kanva, therefore, directed her to go to the residence of Dushyanta. This she did, but when she arrived at his palace she was repudiated by the King until a voice from heaven assured him that Sakuntala had spoken the truth, and that he saw before him his lawful son. Thereupon he recognized her as his queen, and her son as his heir, whom he named Bharata, and who became the founder of the race of the Bharatas. In the drama Kalidasa modified the legend so as to show that the obstacle to her recognition was the consequence of a curse which Sakuntala had incurred from a wrathful sage, who had considered himself treated with scant hospitality by her on one occasion when he had visited Kanva's hermitage. See KALIDASA.

ŚĀKYAMUNI, shä'kyä-mụ'nê. A name of the founder of the Buddhist religion. See BUDDHISM.

SAL (*Shorea robusta*). An East Indian tree of the natural order Dipterocarpaceæ, highly valued for its timber, which resembles teak in properties and uses. The great forests of the southern Himalayas, which in some places has been cut down, have passed under the care of the Government for preservation. Several related species native to India and the Philippine Islands are important timber trees.

SALA, sä'lä. A town of Sweden, situated on the Northern Railroad, 55 miles northwest of Stockholm (Map: Sweden, G 7). It is important on account of its silver mine, which has yielded a large output for centuries, and still produces yearly over 30,000 ounces of silver. Population, in 1900, 6593.

SALA, GEORGE AUGUSTUS HENRY (1828-95). An English journalist, born in London. He came to America in 1863 as special correspondent for the *Daily Telegraph* of London; and in 1864 published *America in the Midst of the War*. He acted as correspondent to the same paper at the Paris Exposition (1867); during the Franco-German War (1870-71); in Spain, Paris, and Venice (1866-67); in Russia (1876); and in Australia (1885). He twice visited the United States as lecturer (1879 and 1885). Sala's pretentious style is finely ridiculed by Matthew Arnold in *Friendship's Garland*. Among Sala's popular books of travel, made up mostly from his contributions to the *Daily Telegraph*, are *A Journey Due North* (1859); *A Trip to Barbary* (1866); *From Waterloo to the Peninsula* (1867); *Rome and Venice* (1869); *America Revisited* (1882); *A Journey Due South* (1885); *Things I Have Seen* (1894); and the most interesting *Life and Adventures* (1895). His social satire is best represented by *Twice Round the Clock* (1859). He also wrote several popular novels: *The Baddington Peerage* (1860); *Captain Dangerous* (1863); and *Quite Alone* 1864).

SALAAM, sä-läm' (Ar. *salām*, peace, from *salima*, to be safe). The common salutation among Mohammedans to those of their own faith; to non-Mohammedans a different form is used. The full salutation is *as-salām 'alaikum*, 'peace be unto you,' and the proper reply is *wa-'alaikum as-salām*, 'and unto you peace.' The giving of the salaam is a duty recommended by Mohammed; the reply is obligatory. Consult Lane, *Manners and Customs of the Modern Egyptians*, ch. viii. (London, 1836).

SAL'ADIN (SALAH-ED-DIN YUSUF IBN EYUB) (1137-93). Sultan of Egypt and Syria, born at Tekrit of Kurdish blood. After a life of pleasure and study he accompanied his uncle, Shirkuh, about 1166, on an expedition dispatched by Nureddin, Sultan of Syria, to reinstate Shawir, the expelled Vizier of Egypt. When the latter, some years later, threw off his allegiance to Nureddin, Shirkuh made a second invasion of Egypt, overthrew Shawir, assumed the vizierate, and, dying soon after, was succeeded by Saladin (1169). The last of the Fatimite caliphs died in 1171 and Saladin became absolute ruler of the country, though he did not proclaim himself Sultan till after the death of Nureddin in 1174. Between 1174 and 1183 Saladin wrested Syria and most of Mesopotamia from the successors of Nureddin. During these conquests he also warred against the Christians, but without success. In 1187 he made a great onslaught upon the Kingdom of Jerusalem, and in July a desperate battle was fought on the shores of Lake Tiberias, which ended in the total defeat of the Christians. Guy de Lusignan, King of Jerusalem, the grand master of the Templars and Hospitalers, and an immense number of prisoners fell into Saladin's hands. The capture of Tiberias, Acre, Jaffa, and Beirut, with many other places, was followed by the surrender of Jerusalem in October. Tyre alone held out against Saladin until relieved by Conrad of Montferrat. The armies of the Third Crusade, under Richard the Lion-hearted and Philip II. of France, retook Acre after a memorable siege of two years (1191), but, owing to the dissensions between Richard and Philip, the great object of the Crusade, the recovery of Jerusalem, was left unaccomplished. Richard entered into a three years' armistice with Saladin by which the coast from Jaffa to Tyre was left to the Christians (1192). Saladin died at Damascus, March 3, 1193. In Saladin the warrior instinct of the Kurd was united to a high intelligence; and even his opponents did not deny him the noblest qualities of chivalry, courage, fidelity to treaties, greatness of soul, piety, justice, and moderation. He was not a mere soldier, but also a wise administrator. Consult: Stanley Lane-Poole, *Saladin and the Fall of Jerusalem* (New York, 1898); Gaston Paris, *La légende de Saladin* (Paris, 1893); Yusuf ibn Rafi, *The Life*

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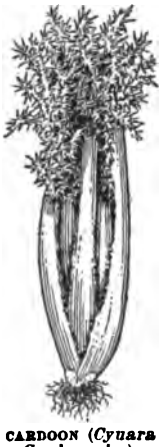
of Saladin, translated for the Palestine Pilgrims' Text Society (London, 1899); Marin, *Histoire de Saladin, sultan d'Egypte et de Syrie* (Paris, 1758).

SALADO, sä-lä'dô, Rio. A river of Northern Argentina. It rises among the Andean ranges in the northwestern part of the country, and flows southeast through the Gran Chaco till it joins the Paraná River opposite the city of Paraná, after a course of about 1000 miles (Map: Argentina, E 9). It is a shallow, unnavigable, and very sluggish stream, meandering over the plain and frequently dividing into a network of channels and backwaters, which during floods are merged into large shallow lagoons. At low water it evaporates so rapidly as to become brackish in its lower course, whence its name, which means 'salt river.'

SALADO, Rio. A river of Western Argentina. It rises on the slope of the Andes in the Province of Catamarca, and flows southward in a rambling course over the plains, parallel with the mountains, from which it receives a number of tributaries (Map: Argentina, D 11). It is about 1000 miles long, and was formerly the most important member of the Colorado River system. Now, however, it never reaches the Colorado, but is lost by evaporation in the extensive salt marshes 80 miles north of that river. There are evidences that the process of desiccation of the surrounding plains is still going on.

SALAD PLANTS. Vegetables whose green parts are used for human food. The plants so employed may be divided into three groups: Piquant, or warm salads such as cress, nasturtium, watercress, and mustard; bitter, of which dandelion, chicory, and endive are typical; and neutral, to which belong such characterless plants as corn salad. Lettuce really belongs to the second group, but when properly grown the bitter flavor is so greatly modified that it approaches the neutral group. The other bitter salads mentioned are similarly improved in flavor. Celery, which also belongs to the bitter group, and lettuce are unquestionably the leading salads in America, thousands of acres being annually devoted to their cultivation. Cardoon, which is grown in much the same way as celery, is rarely cultivated in the United States, but is popular in Europe. It grows somewhat larger than most varieties of celery.



CARDOON (*Cynara Cardunculus*).

In general salads require a very rich, light, well drained, fibrous, loamy soil well exposed to the sun. To be in best condition they must be quickly grown, gathered when in prime vegetative vigor, before any indications of going to seed are manifested, and placed upon the table in the shortest possible time after gathering, before they have lost any of their crispness. See articles upon the various vegetables mentioned above.

SAL'AL. A shrub. See Gaultheria.

SALAMANCA, sä'lä-män'kä. The capital of the Province of Salamanca, in the old Kingdom of Leon, and one of the oldest and most famous university towns of Spain, situated on the Tormes River, 105 miles northwest of Madrid (Map: Spain, C 2). It is built on three hills surrounded by a dreary, treeless plain with a climate severe in winter and very hot in summer. It is surrounded by a wall, parts of which are very old, and a Roman bridge of 27 arches, more than half of which belong to the original structure, crosses the Tormes. The town still has a mediæval aspect, with narrow, crooked streets lined with stately and venerable structures. In the centre of the town is the large Plaza Mayor, the finest of its kind in Spain; it is surrounded by colonnades and by lofty buildings, among which is the town hall. Though a large part of the town was destroyed during the French occupation in 1812, there are still in existence 25 churches, some of which date from the eleventh and twelfth centuries, such as the old cathedral, a massive structure begun in 1100. Immediately adjoining it stands the new cathedral, begun in 1509 and finished in 1733. It is essentially late-Gothic, and has an imposing interior. Opposite the cathedrals stands the university building (see Salamanca, University of), begun in 1415, with an elaborately decorated plateresque façade. Of the 25 colleges and numerous old convents the greater number are in various states of ruin, many having been entirely destroyed by the French. Among other interesting buildings are the Casa de la Salina, now occupied by the Provincial Assembly, and the Church of San Estéban, both dating from the fifteenth century, and both having elaborate plateresque façades, and the Casa de las Conchas, whose façade is ornamented with shells. Industrially and commercially Salamanca is unimportant. Population, in 1887, 22,199; in 1900, 25,019.

Salamanca was known in ancient times as *Elmantica* or *Salamantica*. About B.C. 220 it was captured by Hannibal, who, according to the tradition, spared the city on account of the heroism of its women. It was taken and retaken several times by the Arabs. The town became especially important after the founding of its university in the thirteenth century.

SALAMANCA. A Mexican town of the State of Guanajuato, situated on the right bank of the Lerma River, 28 miles south of the city of Guanajuato (Map: Mexico, H 7), and on the Mexican Central Railroad. It is an important glove and cotton manufacturing centre, and contains an establishment for the manufacture of porcelain. The first settlement in the town was made by the Augustinian Fathers in 1616. Its population, in 1895, was 13,121.

SAL'AMAN'CA. A village in Cattaraugus County, N. Y., 62 miles south of Buffalo; on the Allegheny River, and on the Pennsylvania, the Erie, the Buffalo, Rochester and Pittsburg, and other railroads (Map: New York, B 3). It is situated in a rich farming region, and has a large trade in lumber and important railroad interests. There are railroad repair shops and yards, and various manufactures, including furniture, leather, and lumber products. The government is vested in a village president, chosen annually, and a council. Settled in 1860, Salamanca was incorporated in 1878. Population, in 1890, 3692; in 1900, 4251.

SALAMANCA, University of. A Spanish university, one of the greatest and most re-

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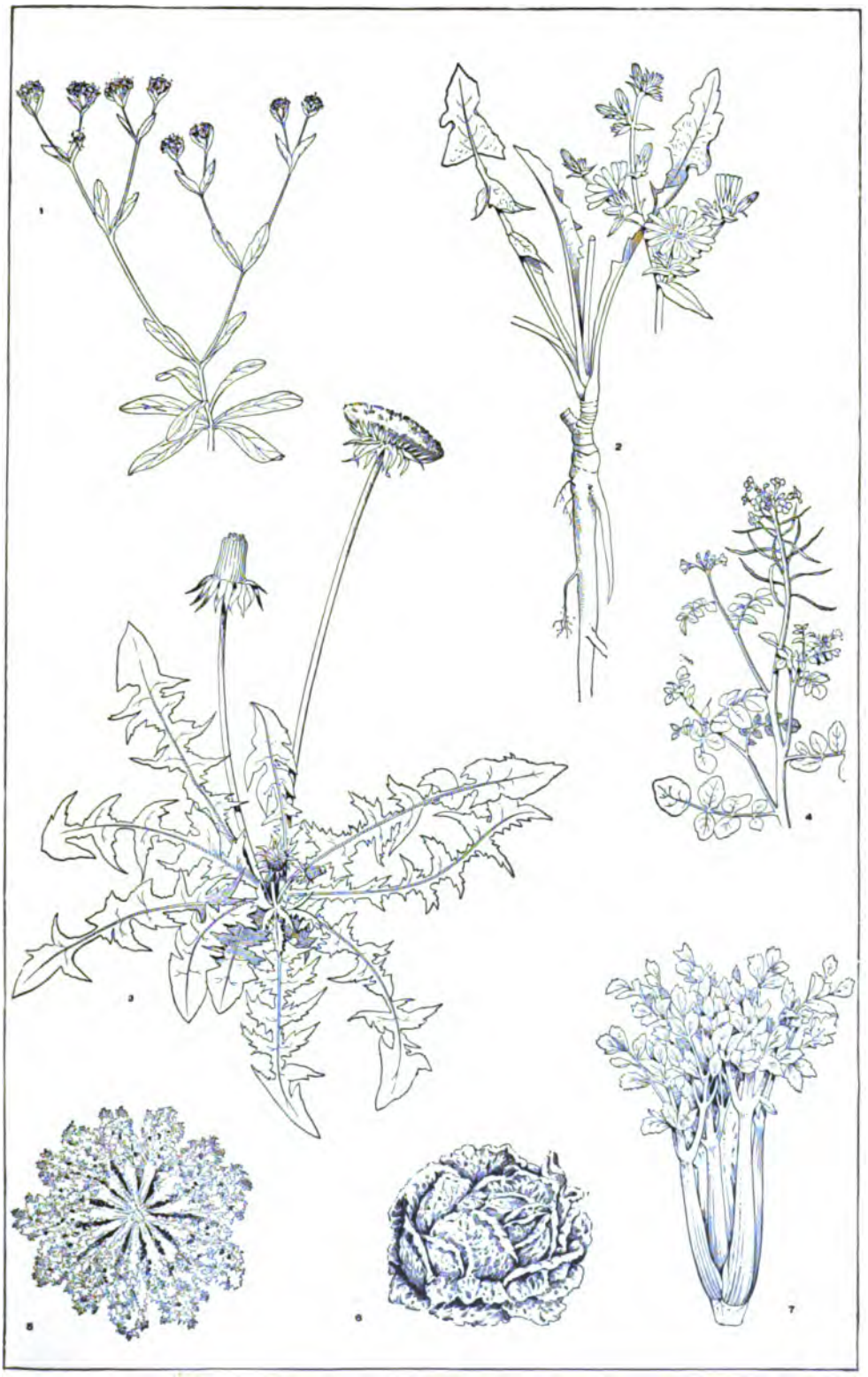
SALAD PLANTS



1. CORN SALAD (Valerianella olitoria).
2. CHICORY (Cichorium Intybus).
3. DANDELION (Taraxacum officinale).
4. WATER CRESS (Nasturtium officinale).
5. ENDIVE (Cichorium Endivia).
6. LETTUCE (Lactuca sativa).
7. CELERY (Apium graveolens).

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nowned of Europe from the fifteenth to the seventeenth century. Founded by Alfonso IX. of Leon (c.1230), and refounded by Saint Ferdinand of Castile in 1242, it came into prominence in the reign of Alfonso X. (q.v.) (1252-82), surnamed the Astronomer. Its chief distinction was in the field of the canon and civil law. Owing to financial difficulties, it led a somewhat checkered existence, but was in alliance with and favored by the Papacy, and in some measure supported by it. Its rise to distinction began in the fifteenth century, and in the two succeeding centuries, particularly in the sixteenth, it was one of the dominating schools of Europe. Here Columbus explained his discoveries, and here the Copernican system was early accepted and taught. From the middle of the sixteenth century, when the number of students reached 6000, the university sank in size and prestige. It was reorganized in 1769-77, but suffered much from the political disturbances of the nineteenth century. Its present organization dates from 1857. It had in 1901 a budget of 150,000 pesetas, about 1200 students, and a library of some 80,000 volumes and 1000 manuscripts.

SALAMANDER (Lat. *salamandra*, from Gk. *σαλάμανδρα*, salamandra; connected with Pers. *samandar*, salamandar). A genus of European tailed Amphibia which inhabit water only in their tadpole state, and return to it only to deposit their eggs, generally living in moist places, as under stones, roots of trees, etc. The general form is very similar to that of newts (q.v.), but the tail is round, not flat. Salamanders feed on worms, slugs, snails, and insects. They are inert, sluggish, and timid creatures and are perfectly harmless. The spotted salamander (*Salamandra masculosa*), six or eight inches long, black, with bright yellow stripes on its sides, and livid blue beneath, is widely spread throughout Europe. The black salamander (*Salamandra atra*) is much smaller, black, the body and tail ringed, the tail almost as if formed of beads. It is abundant in the Alps and mountains of Southern Germany. Other species are found in Spain, Italy, etc., and in Asia. The genus is not represented in the United States. 'Salamander,' however, in the United States is the common name for all the Urodela.

SALAMANDER. A German drinking term of uncertain significance. The custom to which the name is applied, called *exercitium salamandri*, originated with the students of Heidelberg about 1830. At the command of the president, the drinking vessels are rubbed about in a circle on the table and emptied. The participants then rattle the glasses on the table and finally set them down with a simultaneous crash. The salamander is the most formal method of drinking a health.

SAL'AMIS (Lat., from Gk. *Σαλαμίς*, modern name *Kuluri*). A mountainous island of Greece, off the Coast of Attica, in the Gulf of Ægina. It resembles a horseshoe in shape, the opening being to the west. On the northeast it is separated from Attica by a strait about one mile in width, and on the north by the Bay of Aleusis, while at the northwest it approaches close to the Megarian coast. In the northeast of the island was the ancient town of Salamis, near the modern Ambelaki, on the bay opposite the Attic coast. The area is about 36 square miles, and the population about 4600. The island is rocky and mountainous, scantily wooded, and barren, though the coast districts and valleys yield a little grain and wine. Salamis was early an object of strife between the Athenians and Megarians, but after long wars the former secured it early in the sixth century B.C., and from that time it was a part of Attica. Its chief celebrity is due to the decisive naval battle fought between the Persians and Greeks in the strait between the long northeastern promontory of the island and the coast of Attica (B.C. 480). The Greek fleet, under the command of Themistocles and Eurybiades, gathered at the island on the advance of Xerxes against Athens, and is said to have intended withdrawal to the Isthmus when Themistocles persuaded Xerxes to blockade the straits during the night, and in the morning enter them for battle. The result was the complete defeat of the Persians, whose superior numbers and unwieldy vessels were unavailing in the narrow waters.

SALAMIS. An ancient ruined city in the middle of the eastern coast of Cyprus, the most important place on the island (Map: Turkey in Asia, E 5). It had a famous temple of Zeus. Its king, Euagoras (410-364), united Cyprus into one kingdom. The city fell to the Romans in 58 B.C. It was destroyed by an earthquake, and rebuilt by Constantine the Great, named Konstantia, and again made the capital of the island. It was laid waste by the Arabs. The village Hagios Sergios is near its ruins.

SALAMMBÔ' sä'lăm'bō. A novel by Gustave Flaubert (1862). The scene is laid in Carthage in the time of Hannibal, whose sister is the title character. The story is brilliantly realistic, and contains descriptions of great power, dealing often with the weird and bizarre.

SAL AMMONIAC (abbreviation of Lat. *sal ammoniaci*, salt of ammonium). The chloride of ammonium (NH_4Cl). It is of great value in medicine, chemistry, and the arts. It is obtained from the ammoniacal water of gas works, by adding sulphuric acid and then sublimating the sulphate thus formed with sodium chloride. It may be obtained on a small scale by adding hydrochloric acid to a solution of ammonia. In nature it is found in volcanic regions, as an efflorescence on the surface of rocks or as a sublimate in fissures, crystallized or forming crusts, or stalactites. It occurs as colorless, odorless, translucent fibrous masses, having a bitter saline taste, is freely soluble in water, and has a specific gravity of 1.45. In medicine it is used as an expectorant in bronchitis and pneumonia, being a favorite ingredient of cough mixtures; as a diaphoretic, diuretic, and alterative in rheumatism; as a cholagogue in various derangements of the liver; and as an alterative in neuralgia. In catarrhal inflammations of the gastro-intestinal tract it is used to some extent. See AMMONIA.

SALANG, sū-lūng', or **JUNKSEYLON,** jŭnk'sâ-lōn'. An island in the Bay of Bengal, belonging to Lower Siam, situated at the northern entrance to the Straits of Malacca and separated by a narrow strait from the Malay Peninsula (Map: Siam, C 5). It has an area of about 290 square miles and has rich tin deposits which are mined by Chinese and exported to the adjacent British settlements. Population, 12,000.

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SALANGANE (Fr., from *salamga*, the native name), or EDIBLE-NEST SWIFT. An East Indian swift of the genus Collocalia, of which 13 species are known in the Malayan and Australian regions. All are diminutive in size, dark-colored above and white below, with the appearance and habits of swifts; and are of interest mainly because their nests are in demand among the Chinese as the basis of a soup regarded as a luxury. These swifts breed in large companies in sea-fronting caves, attaching their small half-cup-like nests to the rock in the dark interiors of crevices and caverns. They have a glue-like consistency, and are formed mainly of a glutinous saliva produced by the bird, with which is frequently mixed other materials, as bits of straw, feathers, etc. The principal species is *Collocalia fuciphaga*. See Plate of SWIFTS AND THEIR NESTS.

SALARY GRAB. In United States history, the term popularly applied to the general increase of the salaries of Federal officers in 1873. The act of Congress of March 3d of that year provided that the salary of the President should be increased from $25,000 to $50,000 per year, that of the Chief Justice of the Supreme Court should be $10,500 instead of $8500, that of the Vice-President, Cabinet officers, associate justices, and Speaker of the House $10,000 instead of $8000, that of Senators and Representatives in Congress $7500 instead of $5000, and that of employees of both Houses according to similar proportions. The chief objection to the act was that as regards members of Congress it was made retroactive for a period of two years. This feature aroused great popular indignation throughout the country, and the law was repealed by the act of January 20, 1874, as regarded all its beneficiaries except the President and the justices.

SALAYER, sä-lī'ĕr (or **SALEYER**) **ISLANDS.** A group of islands in the Malay Archipelago, belonging to the Netherlands, and situated south of Celebes (Map: East India Islands, F 6). Area, about 270 square miles, of which 250 square miles are covered by Salayer Island, the largest in the group. They are composed mainly of coralline limestone covered with very fertile soil, and are well forested with valuable timber. The chief products are tobacco, potatoes, indigo, and cotton, and excellent horses are exported to Celebes, with which there is regular steamship connection. The population of the group is about 80,000, chiefly Mohammedan Malays engaged in commerce, fisheries, and preparation of trepang.

SALDANHA, säl-dä'nyä, JOÃO CARLOS, Duke of (1791-1876). A Portuguese statesman, a grandson of Pombal, born at Arinhaga. He studied at Coimbra, served against the British, and was made a prisoner in 1810. On his release he went to Brazil, where he was employed in the military and diplomatic services. He returned to Portugal after the declaration of the independence of Brazil. He became Minister of Foreign Affairs in 1825, and was Governor of Oporto in 1826-27. He joined Dom Pedro against the usurper Dom Miguel, with whom he concluded the convention of Evora. In 1835 he was made Minister of War and president of the Council, but resigned in the same year. After the revolution of 1836, which he had instigated, he went into exile until recalled in 1846, when he formed a Ministry, which fell in 1849. In 1851 he organized a new revolt and became chief Minister as the leader of a coalition party formed of Septembrists and dissatisfied Chartists. He remained in power until the accession of Pedro II. in 1856, and was subsequently Minister to Rome (1862-64 and 1866-69). He became Prime Minister once more for a few months in 1870 (May-August), and was sent in 1871 to London as Ambassador, where he died.

SALE. A town in Cheshire, England, suburban to Manchester (q.v.). Population, in 1891, 9600; in 1901, 12,000.

SALE or **SALES** (AS. *sala*, from *sellan*, Goth., OHG. *saljan*, to give, sell; connected with Lith. *sulyti*, to proffer, offer). A contract whereby the absolute or general ownership of property is transferred from one person to another for a money consideration, or loosely for any consideration. In the latter case the transaction is more accurately called a barter, trade, etc. The term *sales* is used specifically by legal text writers of such transfers of personal property, the treatises on that subject being commonly said to treat of 'the law of sales.' For the treatment of the subject in relation to land, or real property, see CONVEYANCE; DEED; REAL PROPERTY.

SALE OF PERSONAL PROPERTY. A sale of personal property is often spoken of as a 'bargain and sale' or an 'executed contract of sale,' to distinguish it from a contract to sell; that is, from a contract to transfer general ownership in the future. At common law this contract could be oral or written. By the Statute of Frauds (q.v.) a contract for the sale of goods must be in writing if the price exceeds a specified sum, unless there is an acceptance and receipt of a part of the goods, or a part payment of the price. The general rule has been laid down by our courts that where a bargain is made for the purchase of specific existing goods, and no stipulation is made about payment and delivery, the ownership passes at once to the buyer, and the right to the price passes to the seller. In Roman law a sale was treated as a conveyance, and tradition, i.e. actual delivery, was necessary to the transfer of title. Again, Roman law required the payment of the price by the purchaser as a condition of title's passing, unless it was waived by the parties. Modern European codes, although founded on the Roman law, generally reject the latter rule, while continuing the former.

The difference between a sale and various business transactions of a similar character is perfectly clear in principle, although at times there is practical difficulty in determining to what class a particular venture belongs.

In rare instances the general ownership of personal property passes for a price without a contract. This is sometimes called a *quasi* sale. It occurs when one who has taken another's property without his consent is sued in trover (q.v.) for the value, and pays the judgment. Upon such payment it is generally held that title is to be treated as vesting in the wrongful taker, as of the date of taking.

REQUISITES OF A VALID SALE OR CONTRACT TO SELL. These are four: Competent parties; mutual assent; the existence of the personal property; and a price in money. The first two requisites have been considered, at sufficient length, in the article on contracts (q.v.). The last one has

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been referred to in a preceding paragraph. It is, therefore, necessary to discuss here only the third. In case of a bargain and sale, the thing sold must then be in existence. At times, persons declare that one sells and the other buys specified property which they know is not in existence. This can take effect, in our law, only as a contract to sell; for it is accounted an elementary principle that a man cannot grant personal property in which he then has no interest or title. Accordingly, if, before this contract to sell has been executed by transferring the ownership to the buyer, a creditor of the seller levies an execution (q.v.) on the property, such creditor will be able to keep it. In this country it is generally held that the owner of property can make a valid bargain and sale of its product, growth, or increase, even before that comes into actual existence.

When Title Passes. In case of a bargain and sale, title passes when the contract is made. In the case of a contract to sell, title is to pass in the future. If the parties clearly and definitely state the time or condition of passing title, no difficulty arises. In the hurry and rush of modern business life, however, such definiteness is often neglected.

Rule 1. Where there is a contract for the sale of specific goods and the seller is bound to do something to the goods, for the purpose of putting them into a deliverable state, the title does not pass until such thing is done. In England, it does not pass until the buyer is notified that the thing is done.

Rule 2. When there is a contract for the sale of unascertained or future goods by description, and goods of that description and in a deliverable state are unconditionally appropriated to the contract, either by the seller with the assent of the buyer, or by the buyer with the assent of the seller, the title thereupon passes to the buyer. Such assent may be express or implied, and may be given either before or after the appropriation is made.

The difficult questions under this rule are, first, whether the required assent has been given; and second, whether the appropriation is unconditional. The principal examples of a conditional appropriation are afforded by shipments of goods C. O. D., and under bills of lading (q.v.) which make the goods deliverable to the seller or his agent or his assignee. If the seller takes a bill of lading, making the goods deliverable to the buyer, and does not require payment for the goods as a condition of title's passing, the appropriation is unconditional, so far as he is concerned. Then the question arises whether the buyer has assented to such appropriation. Generally speaking, he does assent where he orders goods to be sent to him by a common carrier, *provided* the goods sent are of the kind and quality which he ordered.

It is often quite important to determine whether title passed at the time of shipment; for if it did, any loss or injury of the goods during their transit must be borne by the buyer, the general rule being that the risk of loss or harm goes with the title, unless the parties have otherwise agreed.

Conditions and Warranties. One of the most perplexing topics in the law of sales is that of warranty (q.v.). In most of our jurisdictions, many of the seller's engagements are termed implied warranties, although they are actually treated as conditions in the decision of cases. The English Sale of Goods Act of 1893 (56 and 57 Vict., c. 71) has simplified this topic by defining 'condition' and 'warranty,' by classifying the various engagements of the seller, and by describing the consequences of their breach. It is believed that these provisions of the statute are an accurate codification of common law principles, although it must be admitted that in a few of our States different doctrines obtain. A condition is either a statement or a promise which forms the basis of the contract of sale. See Caveat Emptor; Market Overt; Stoppage in Transitu.

Consult: Blackburn, *A Treatise on the Effect of the Contract of Sale* (London, 1885); Campbell, *The Law Relating to the Sale of Goods* (ib., 1891); Chalmers, *The Sale of Goods Act* (ib., 1896); Benjamin, *The Sale of Goods* (Boston, 1899); Burdick, *The Law of Sales of Personal Property* (ib., 1901).

SALE, George (1697-1736). A translator of the Koran. He was admitted to the Inner Temple in 1720 and afterwards practiced as a solicitor. He early began the study of Arabic and acquired a thorough mastery of the language and a close acquaintance with Mohammedan thought and customs, although he never left his native land. From 1726 till 1734 he was connected with the Society for the Promotion of Christian Knowledge, for which he prepared an Arabic translation of the New Testament besides acting as legal adviser, business manager, and in other capacities. His translation of the Koran, published in London in 1734 and many times reprinted, was the first adequate translation of the Koran ever made and is considered by many the best in any language at the present time. The material incorporated from Mohammedan authorities renders it a commentary as well as translation, and the notes and preliminary discourse are still of great value.

SALE, Sir Robert Henry (1782-1846). A British soldier, popularly known as the hero of Jelalabad. He was born in England, and was the son of Colonel Sale, of the East India Company's service. He took active part in the Burmese War of 1824-26, distinguishing himself at Rangoon, Bassein, and especially at Prome. In 1838 he was given command of the First Bengal Brigade of the army on the Indus in the Afghan Expedition, and was severely wounded while leading the storming party at Ghazni. In 1840 he was sent to Kohistan against Dost Mohammed Khan, and, after the capture of several fortresses, forced him to surrender at Purwan. When the Afghans rose against the British at the close of 1841, Sale, after forcing his way through the Khurd-Kabul, Tezen, and Jagdalak passes, was driven back upon Jelalabad, where he was besieged by Akhbar Khan, the son of Dost Mohammed. In April, 1842, he made a sortie and routed the Afghans, capturing their ammunition, guns, and camp. He was relieved by Pollock, commanding the punitive expedition against the Afghans, and participated with him in the recapture of Kabul. Sale was mortally wounded fighting against the Sikhs at Mukdi in 1846.

SA'LEM. The capital of a district of the same name in the Province of Madras, India, 207 miles southwest of the city of Madras, on the

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Tirumanimuttar River (Map: India, C 6). It is attractively situated, in the hilly Shevaroy region, much resorted to for its picturesque scenery, and has a college and high schools. Weaving and the manufacture of carpets and cutlery are important industries. In the vicinity there are rich deposits of iron and limestone. Population, in 1901, 70,621.

SALEM. A city and the county-seat of Marion County, Ill., 70 miles east of Saint Louis, Mo.; on the Baltimore and Ohio Southwestern and the Chicago and Eastern Illinois railroads, and the terminus of the Illinois Southern (Map: Illinois, D 5). It is surrounded by a section noted for the production of apples, and engaged also in farming and stock-raising. There are coal deposits and mineral springs in the vicinity. Flour is the principal manufactured product. Population, in 1890, 1493; in 1900, 1642.

SALEM. A city and the county-seat of Essex County, Mass., 16 miles northeast of Boston; on Massachusetts Bay and on the Boston and Maine Railroad (Map: Massachusetts, F 2). It is situated on a narrow peninsula. Salem is intimately connected with the history of the colonial period, and its quaint old houses and irregular streets are of great interest. Hawthorne's birthplace and early home, the custom-house where he wrote the preface to *The Scarlet Letter*, and the home of Roger Williams are especially noteworthy. Other features include three attractive parks: the Willows, the Common, and Mack Park; the Essex Institute, with interesting paintings and relics, and a library of 100,000 volumes and 400,000 pamphlets; the Salem Athenæum, with a library of 32,000 volumes; the Peabody Academy of Science, the home of the East India Museum; and the public library, with 40,000 volumes. One of the educational institutions is a State Normal School. There are in the city an almshouse, the Bertram Home for Aged Men, Home for Aged Women, City Orphan Asylum, and Salem Hospital, besides two other hospitals. Formerly noted for its commercial importance, Salem is at present primarily an industrial city, the various industries having in the census year 1900 an invested capital of $7,450,935, and an output valued at $12,257,449. Boots and shoes, cotton goods, leather, machinery, and lumber products constitute the leading manufactures. The government is vested in a mayor, chosen annually, and a bicameral council, and in subordinate officials, who are either elected by the council or chosen by popular vote. For maintenance and operation, the city spends annually about $552,000, the main items being: for schools, $118,000; interest on debt, $52,000; streets, $52,000; charities, $47,000; police department, $38,500; municipal lighting, $37,000; and fire department, $35,000. The water-works are owned by the municipality. Population, in 1890, 30,801; in 1900, 35,956.

Salem (the Indian Naumkeag), after Plymouth, the oldest town in Massachusetts, was first settled by Roger Conant and his associates in 1626. In 1628 Governor John Endicott at the head of a small company came hither from England and in 1629 the present name was adopted. In 1692 the witchcraft delusion appeared in the district later set apart as Danvers, and in the six months from March to September nineteen persons were hanged and one old man was pressed to death. On February 26, 1775, a small body of English troops under Colonel Leslie, sent from Boston to destroy supplies stored at Salem, was met at North Bridge and forced to retire, this being one of the first instances in the colonies of armed resistance to Great Britain. For many years after the Revolution, Salem was an important commercial centre, and it was by Salem merchants that American trade was opened with China, Japan, Africa, and Brazil. But, the depth of the harbor being insufficient for vessels of large draught, Salem's trade was gradually transferred to Boston and New York. Salem was incorporated as a town in 1630 and was chartered as a city in 1836. Consult: Felt, *Annals of Salem* (Salem, 1845-49); Osgood and Batchelder, *Historical Sketch of Salem* (ib., 1879); Upham, *Salem Witchcraft, with an Account of Salem Village* (Boston, 1867); Webber and Nevins, *Old Naumkeag* (Salem, 1878); Nevins, *Witchcraft in Salem Village* (ib., 1892); and a sketch in Powell, *Historic Towns of the New England States* (New York, 1898).

SALEM. A city and the county-seat of Salem County, N. J., 38 miles south by west of Philadelphia; on the Salem River, near its confluence with the Delaware, and on the West Jersey and Seashore Railroad, and the Salem and Philadelphia Steamboat Line (Map: New Jersey, B 4). It is an attractive residential place, and has the John Tyler Library, with 11,600 volumes, and the Friends' Select Graded School. The surrounding region is engaged in farming. Salem is an important industrial centre, its principal establishments including glass works, fruit and vegetable canneries, and manufactories of oilcloth, wall paper, hosiery, women's garments, iron castings, machinery, and carriages. The government, under the revised charter of 1868, is vested in a mayor, elected every three years, and a unicameral council. The water-works are owned and operated by the municipality. Population, in 1890, 5516; in 1900, 5811.

Settled in 1675 by John Fenwick and a company of Quakers, Salem was incorporated as a town in 1695, and became a city in 1858. During the Revolution it was alternately occupied by British and American troops. Consult Johnson, *An Historical Account of the First Settlement of Salem* (Philadelphia, 1839).

SALEM. A city in Forsyth County, N. C., 112 miles west by north of Raleigh; on the Southern and the Norfolk and Western railroads (Map: North Carolina, B 1). It is the seat of the Salem Female Academy and College (Moravian), opened in 1802. Salem is chiefly a residential city adjoining Winston, the county-seat, the two municipalities forming practically one industrial community. (See WINSTON.) Under the revised charter of 1891, the government is vested in a mayor, elected biennially, and a unicameral council. Salem was founded by a body of Moravians in 1766 and was for many years distinctively a church community—the church having complete charge of secular as well as ecclesiastical affairs. Count Zinzendorf drew up the plans on which Salem was laid out. Population, in 1890, 2711; in 1900, 3642.

SALEM. A city in Columbiana County, Ohio, 70 miles southeast of Cleveland; on the Pittsburg, Fort Wayne and Chicago, and the Pittsburg, Lisbon and Western railroads (Map: Ohio, J 4). It has a public library. Salem is the centre of a coal-mining region, and manufactures

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cornices, engines, steel, wire nails, pumps, tools, feed cutters, riveting machines, china, stoves, tile, brick, furniture, etc. The government is vested in a mayor chosen biennially, a unicameral council, and boards of public service and public safety. Settled in 1807 Salem was incorporated as a village in 1830, and was chartered as a city in 1887. It was a station of the underground railway (q.v.) before the Civil War. Population, in 1890, 5780; in 1900, 7582.

SALEM. The capital of Oregon, and the county-seat of Marion County, 52 miles south of Portland; on the Willamette River, and on the Southern Pacific Railroad (Map: Oregon, C 5). It is situated on ground rising gradually from the river, and has wide and beautifully shaded streets. The State Capitol, a handsome building surmounted by a high dome, occupies a site overlooking the city. Other prominent structures are the Federal building, city hall, courthouse, State Penitentiary, State Insane Asylum, and the opera house. Salem is the seat of Willamette University, originally founded by the Methodist Episcopal Church as an Indian school and opened as a university in 1844; the Academy of the Sacred Heart; and a large Indian Training School. The State School for Deaf Mutes, the State Institute for the Blind, and the State Reform School also are here. The State Library has 25,000 volumes, and there are also in the city Masonic and Odd Fellows libraries. Salem is surrounded by a region having extensive fruit, hop, and wheat interests, and is of considerable industrial importance. Flour, woolens, foundry and lumber products, and machinery constitute the leading manufactures. The government is vested in a mayor, elected biennially, and a unicameral council. Population, in 1900, 4258.

Salem was laid out in 1844 near the site of a Methodist mission, established ten years earlier. It was chartered as a city in 1853. In 1864, by a popular vote, it was made the permanent State capital, though the Legislature had previously met in the city, and in 1857 the Constitutional Convention had been in session here.

SALEM. A town and the county-seat of Roanoke County, Va., seven miles west of Roanoke; on the Roanoke River, and on the Norfolk and Western Railroad (Map: Virginia, D 4). The scenery afforded by the Alleghany and Blue Ridge Mountains in the vicinity of Salem is very beautiful. The town is the seat of Roanoke College (Lutheran), opened in 1853; and has a Lutheran and a Baptist orphanage. Farming, stock-raising, and fruit-growing are the leading industries of the surrounding district. There are deposits of iron, and several sulphur springs. Salem manufactures leather, wagons, agricultural implements, machinery, brick, mattresses, woolen goods, etc. The government is vested in a mayor, chosen biennially, and a unicameral council. The waterworks and electric light plant are owned and operated by the municipality. Settled in 1802. Salem was incorporated in 1836, and received its present charter in 1892. The town stands on land originally granted by George III. to Andrew Lewis. Population, in 1890, 3279; in 1900, 3412.

SALEMI, sä-lā'mē (Lat. *Halicyæ*). A city in the Province of Trapani, Sicily, 64 miles by rail southwest of Palermo (Map: Italy, G 10). It is situated on a hill 1450 feet above the sea and four miles west of the railway station. It has a ruined castle, a library, a technical school, and a gymnasium, and markets grain, wine, oil, and cattle. Population (commune), in 1901, 17,004.

SALERATUS (Neo-Lat., formerly *sal aëratus*, aërated salt). A name applied to potassium bicarbonate, which was formerly much used in cooking, as sodium bicarbonate (cooking soda) is used at present. It may be made by passing carbonic acid gas through a solution of potassium carbonate (K_2CO_3) as long as any gas is absorbed, then filtering the liquid and evaporating to crystallization. Potassium bicarbonate ($KHCO_3$) is a colorless and odorless compound. It still finds some use in medicine.

SALERNO, sä-lēr'nō (Lat. *Salernum*). The capital of the Province of Salerno (formerly Principato Citeriore), Italy, and the seat of an archbishop. It is beautifully situated at the head of the Gulf of Salerno, 34 miles southeast of Naples (Map: Italy, J 7). The principal street is the Corso Garibaldi along the water front. The harbor is protected from sand by a mole. There are good hotels, a municipal theatre, three hospitals, and normal, classical, and technical schools. The medical school of Salerno was the doyen of medical faculties in Europe. (See SALERNO, SCHOOL OF.) The Cathedral San Matteo was built by Robert Guiscard (q.v.) and dedicated in 1084, but suffered by the restoration of 1768. Along the walls of the atrium are fourteen ancient sarcophagi used for Christian burials by the Normans. The bronze doors made in Constantinople date from the eleventh century and in the interior are ancient mosaics and frescoes. On the hill above the town are the ruins of a Lombard castle. Salerno markets wine, oil, fruit, cotton, tobacco, and silk, and manufactures cotton and woolen goods. The ancient *Salernum*, which at the time of the Second Samnite War still belonged to the Samnites, became later a Roman colony. After the fall of the Western Empire the town was successively held by the Lombards, the Normans, and the houses of Hohenstaufen and Anjou. Population (commune), in 1881, 31,245; in 1901, 42,727. Consult Schipa, *Storia del principato longobardo di Salerno* (Naples, 1887).

SALERNO, GULF OF, or GULF OF PÆSTUM. An arm of the Mediterranean Sea, on the western coast of Italy, southeast of the Bay of Naples (Map: Italy, J 7). It is 36 miles wide at its entrance, and sweeps inland for 24 miles. On its shores are the towns of Amalfi and Salerno.

SALERNO, SCHOOL OF. A once famous medical school at Salerno, Italy. As early as the tenth century Salerno was famous for its numerous physicians. Ordericus Vitalis (q.v.), who first mentions the medical school, ascribes to it an ancient origin, but the attempt to trace its inception to Saracen influence has been refuted by Henschel, Daremberg, and De Renzi. After the middle of the eleventh century the system of medicine known as 'Methodism' in vogue at Salerno, whose chief representative in antiquity was Cœlius Aurelianus, gave way to that of 'Humorism,' based on Hippocrates and Galen, and from this time dates the Medical Renaissance. In 1253 the faculties of Naples were transferred to Salerno, thus transforming it into a univer-

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sity for a short time. They, however, returned to Naples in 1258, the union not having realized the anticipated prosperity. Women studied and taught there, thus anticipating our coeducational institutions. The introduction of Arabic medicine in other medical institutions was the main cause of decline of the school. In the beginning of the fourteenth century its prestige had completely passed away, and henceforth its decline continued until in 1811 it was reduced to a mere gymnasium, and in 1817 it ceased to exist.

SALES. See SALE.

SALES, SAINT FRANCIS DE. See FRANCIS DE SALES.

SALEYER (sâ-lī'ĕr) **ISLANDS.** A group of islands near Celebes. See SALAYER ISLANDS.

SALÉZA, sâ'lâ'zâ', ALBERT (1867—). A French operatic tenor, born at Bruges. He was educated at the Paris Conservatory and made his début at the Opéra Comique in 1888. He created the rôles of Æneas in Berlioz's *Prise de Troie* and Richmond in Salvayre's *Richard III.* at Nice, in which city he sang from 1889 to 1891. The following year he was engaged in the Grand Opéra, Paris, and appeared in the first performances of Reyer's *Salammbô* and Verdi's *Otello.* In 1898 he made his American début, and was especially successful in his interpretations of Italian rôles.

SALFORD, sąl'fĕrd. A municipal county and Parliamentary borough in Lancashire, England, virtually a portion of the city of Manchester (Map: England, D 3). It possesses an older municipal history than its larger neighbor, having obtained its first charter in 1231, and a charter of incorporation in 1844. Several railway viaducts and 16 bridges connect it with Manchester. The borough covers an area of eight square miles; it has fine libraries, a museum and art gallery in the beautiful Peel Park, one of four parks with a total area of 83 acres. Population, in 1891, 198,139; in 1901, 220,956. Consult: Darbyshire, *Olde Manchester & Salford* (Manchester, 1887); *The Official Handbook of Manchester and Salford* (Manchester, 1899).

SALGÓTARJÁN, shŏl'gō-tŏr-yän. A town of Hungary, in the County of Nógrád, 78 miles by rail northeast of Budapest. The coal-mining interests are important and the town has iron works. There are, for working men, a hospital, baths, and schools. Population, in 1900, 13,552.

SALICIN (from Lat. *salix,* willow), $C_6H_4(OH)CH_2(OC_6H_{11}O_5)$. A member of the group of organic compounds to which the term glucosides is applied by chemists—a group which is specially characterized by the fact that each of its members, when exposed to the action of dilute acids or of ferments, takes up water and breaks up into sugar and other compounds. Salicin occurs in the bark of the various species of willow and poplar. It may be obtained in small, colorless, glistening prisms of an intensely bitter taste, which are readily soluble in hot water and in alcohol, moderately soluble in cold water, and insoluble in ether and chloroform. If introduced into the body, salicin is decomposed with formation of salicylic acid, which is then rapidly absorbed, probably in the form of its sodium salt. The physiological action of salicin is therefore in almost all respects identical with that of salicylic acid (q.v.). Salicin, however, has a much less irritating effect on the stomach, and a much weaker depressing effect on the heart, than free salicylic acid.

SALIC LAW (*Lex Salica*). One of the earliest of the so-called 'laws of barbarians,' which were put into written form in very corrupt Latin between the middle of the fifth and the beginning of the ninth century, and which set forth the customary law of the different German tribes. The Lex Salica contains a part of the law governing the Salian or Merovingian Franks. A prologue of much later date than the Lex itself places its composition in a period in which the Franks were governed by many chiefs (*proceres*); but from internal evidence the Lex is believed to have been drawn up in the reign of Clovis and near the close of the fifth century (A.D. 486-496). It consists largely of tariffs of 'compositions' to be paid for various injuries, and it deals mainly with what we should call the law of torts and crimes and the law of procedure. Of its original 65 titles, only six or seven are devoted to the law of family, property and inheritance. The older manuscripts contain the so-called 'Malberg gloss'—interpolated Frank words and phrases, which serve in some cases to explain the Latin words, in other cases to indicate the formal words to be employed in legal proceedings.

During the following three centuries much new matter was inserted by private copyists, a fact which renders the reconstruction of the original text more or less uncertain. A revised text, dating from the Carolingian period, in which the Latin was purged of its worst barbarisms and the Malberg gloss eliminated, is known as the Lex Emendata. The term 'Salic law' is often applied exclusively to that part of the law which relates to inheritance by women. The paragraph reads as follows: "But of Salic land, no portion of the inheritance shall come to a woman; but the whole inheritance of the land shall come to the male sex." It is evident that there is no question here of a woman's inheriting the throne, as is popularly supposed. The term Salic law was first employed, in this sense, in connection with the exclusion of women from the throne in France in the fourteenth century, during the struggle between Philip VI. and Edward III. of England for the French crown. This law was introduced into Spain by Philip V. in 1714, but was revoked again by Ferdinand VII. in 1830.

The best text is Hessels, *Lex Salica* (London, 1880). The literature, which is extensive, is cited in Brunner, *Deutsche Rechtsgeschichte* (Leipzig, 1887), i., pp. 293 et seq.; Viollet, *Précis de l'histoire du droit français* (Paris, 1885), pp. 95 et seq.; and in Esmein, *Cours élémentaire d'histoire du droit français* (Paris, 1892), pp. 103 et seq.

SALICYLATES (from Lat. *salix,* willow), MEDICAL USES OF THE. The chief salicylates are those of sodium and lithium, together with methyl salicylate or in the form of oil of wintergreen. They are employed in the place of salicylic acid, because they are less irritating to the stomach, less depressing to the heart, and less liable to give rise to the disagreeable train of symptoms called *salicylism.* The more marked of these are ringing in the ears, deafness, partial

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blindness, headache, vomiting, and delirium. The chief use of the salicylates is in rheumatism, in many acute cases of which they seem to possess a specific effect. The sodium salt is more effective in acute, the lithium salt in chronic rheumatism. When given in rheumatic fever, sodium salicylate and salicylic acid cause a fall of temperature, and marked relief from pain, and it is thought they diminish the likelihood of the cardiac complications so characteristic of this disease. (See RHEUMATISM.) Salicylate of sodium is used with success for causing the absorption of pleural effusions, in conjunction with purgatives and diuretics. In quinsy and true tonsillitis, especially of rheumatic origin, the salicylates will often prevent suppuration, shorten the attack, and promptly relieve the pain and swelling.

Mercury salicylate has the properties of a mercurial rather than those of salicylic acid and is employed as a hypodermic injection in urgent cases of syphilis. *Bismuth salicylate* is an intestinal antiseptic much used in Europe. See SALICYLIC ACID.

SALICYLIC ACID, $C_6H_4(OH)COOH$. An important compound of carbon, hydrogen, and oxygen, existing in combination in various plants. It is the chief component of oil of wintergreen, which is obtained by distilling the blossoms of the Gaultheria procumbens; it is likewise combined in the volatile oil of betula, obtained by distilling the bark of the sweet birch (*Betula lenta*). Salicylic acid is employed in the manufacture of certain dyestuffs; and as it has no odor and acts as a powerful antiseptic, it is extensively used for the preservation of various articles of food, such as eggs, milk, fruit, pickled vegetables, etc. It is also added to wine and beer to check fermentation, and thus to prevent the formation of deleterious products. In small quantities the acid is perfectly harmless. If the food, however, is very poor, it requires a rather large amount of acid to mask its disagreeable qualities and keep it fit for sale. Now, the combined effect of spoiled food and a great deal of the acid may be more or less injurious; and therefore the addition of salicylic acid to beer has, in several European countries, been forbidden by law. The salts of salicylic acid do not possess the antiseptic properties of the acid. The salt most commonly used is the salicylate of sodium, a white powder very soluble in water and having a sweetish, saline taste. The acid, or preferably its sodium salt, is used in medicine for a variety of purposes. It is a specific for many cases of acute rheumatism, producing rapid cessation of pain and a lowering of febrile temperature. In many persons, however, the acid itself and its salts are liable to produce peculiar symptoms known as *salicylism:* there is ringing in the ears, headache, irregular pulse, etc. Continued administration of the drug to such persons may cause violent delirium and eventually death.

Salicylic acid is manufactured either from oil of wintergreen or from carbolic acid (phenol). Oil of wintergreen is composed mainly of methyl salicylate, the ethereal salt or ester formed by the combination of methyl alcohol with salicylic acid. When the ester is boiled with caustic potash, it decomposes into its constituents, and thus the acid is obtained in the form of its potassium salt. Hydrochloric acid readily takes up the metal of the latter, setting free its salicylic acid, which may then be rendered pure by recrystallization from alcohol. At present, however, salicylic acid is manufactured mostly from phenol. Phenol (carbolic acid) combines with caustic soda, yielding sodium phenate; and when the latter is heated to 120° to 140° C. (250° to 285° F.) with carbonic acid gas under pressure, or preferably with liquid carbonic acid in closed iron vessels, the sodium salt of salicylic acid is produced. This salt is decomposed with hydrochloric acid, and the salicylic acid set free is purified by recrystallizing from ordinary alcohol or by distilling with a current of steam.

When heated with lime, salicyclic acid loses the elements of carbonic acid and is reconverted into phenol. Pure salicylic acid is a white crystalline substance, very soluble in alcohol, sparingly soluble in water, and having a sweetish-sour taste. Its presence in a given article is usually detected by means of ferric chloride, which imparts to solutions of the acid an intense violet coloration.

SALIDA, sä-lī'dä *or* -lē'dä. A city in Chaffee County, Colo., 97 miles west by north of Pueblo; on the Denver and Rio Grande Railroad (Map: Colorado, E 2). It is situated in a section noted for its mineral wealth and for its rich agricultural lands. There are a smelting plant and repair and construction shops of the Denver and Rio Grande Railroad. Salida Academy, a public library, and the Denver and Rio Grande Hospital are features of the city. The waterworks are owned by the municipality. Population, in 1890, 2586; in 1900, 3722.

SALIENT (Fr. *sallient*, from Lat. *saliens*, pres. part. of *salire*, to leap). In heraldry (q.v.), a lion represented in the act of springing on its prey.

SALIENT. See FORTIFICATION.

SALIERI, sä-lyä'rē, ANTONIO (1750-1825). An Italian composer, born in Legnano. In 1765 he entered the San Marco singing school, Venice, and shortly afterwards went to Vienna as a pupil of Gassmann. In 1770 he produced his first opera, *Le donne letterate*, with great success. He was a very popular composer in his time, but is now almost entirely forgotten. His chief fame was as a composer of dramatic and church music. Of his operas *Les Danaïdes* (1784) and *Tarare* (1787) are considered the best. He wrote in all 46 operas, 3 oratorios, 8 cantatas, 2 symphonies, and many miscellaneous compositions. Among his pupils were Beethoven and Schubert. He died in Vienna.

SALIGRAMI, sä'lē-grä'mē. A river of India. See GANDAK.

SALII, sā'lī-ī (Lat., dancers). A Roman priesthood, consecrated to the service of the war-god. They appear to have existed in both the early communities that combined to form the city of Rome, those of the Palatine (*Salii Palatini*) serving Mars, those of the Quirinal (*Salii Collini* or *Agonenses*) originally Quirinus. Later the joint body was regarded as under the protection of Jupiter, Mars, and Quirinus. The Salii were performers of the war-dances in honor of the god. Each body numbered 12, and each had its own head and ritual. They wore the old military garb, a blood-red tunic, breastplate, and pointed helmet, and carried a sword, and especially the sacred shields and spears, kept always

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in the Regia, and of which it was said that one of each had fallen from heaven. Their chief festivals seem to have been the *Quinquatrus* in March, i.e. at the opening of the campaigning season, and the *Armilustrium* in October, when the purifications for the closed campaign were made.

SALINA, sȧ-lē'nȧ. One of the Lipari Islands (q.v.).

SALINA. A city and the county-seat of Saline County, Kan., 100 miles west of Topeka; on the Smoky Hill River, and on the Union Pacific, the Missouri Pacific, the Chicago, Rock Island and Pacific, and the Atchison, Topeka and Santa Fe railroads (Map: Kansas, E 3). It is the seat of Kansas Wesleyan University (Methodist Episcopal), opened in 1886. The city also has the Salina Normal University, Saint John's School, a public library, Oak Dale Park, and a fine Government building. Salina is the commercial centre of a farming and stock-raising region. There are several grain elevators, two large wholesale groceries, and manufactories of flour, carriages, and foundry products. The government is vested in a mayor, elected biennially, and a unicameral council. Salina was settled about 1860, incorporated as a city of the third class in 1870, and received its present charter as a city of the second class in 1878. Population, in 1890, 6149; in 1900, 6074.

SALINAS, sȧ-lē'nȧs. A city and the county-seat of Monterey County, Cal., 118 miles southeast of San Francisco; on the Southern Pacific Railroad (Map: California, C 3). It is the centre of a fertile section producing sugar beets, potatoes, and wheat, and having important dairying and stock-raising interests. Flour and machine-shop products constitute the leading manufactures. The Spreckels Beet Sugar Factory, one of the largest concerns of its kind in the world, is four miles from the city. Population, in 1890, 2339; in 1900, 3304.

SALINA STAGE. A subdivision of the Silurian system receiving its name from Salina, N. Y., and comprising a series of shales and marls with beds of rock salt and gypsum. The rocks are of most importance in New York, Ohio, and Pennsylvania, where they are the basis of an extensive salt industry. See SILURIAN SYSTEM.

SALINS, sȧ'lăn'. A watering-place in the Department of Jura, France, 30 miles south by west of Besançon, on the Furieuse River (Map: France, M 5). It is situated amid picturesque scenery and has numerous mineral springs. The extensive thermal establishment in which the salt of the springs is also prepared for the market is one of the chief buildings in the town. Population. in 1901, 5525.

SALISBURY, sąlz'ber-I, or NEW SARUM. The capital of Wiltshire, England, an episcopal city on the Avon, at its junction with two affluents, 81 miles west-southwest of London, and 23 miles northwest of Southampton (Map: England, E 5). The town dates from 1220, in which year the cathedral was founded. The cathedral, the principal building of Salisbury, is one of the finest specimens of early English architecture. It was completed in 1285. The spire is the "most elegant in proportions and the loftiest in England." Its height from the pavement is 406 feet. The cathedral is 473 feet long; height in the interior, 81 feet; width of great transept, 203 feet. It is in the form of a double cross, is perfect in its plan and proportions, and in the main uniform in style. The west front is beautiful and graceful, though now stripped of statues, with which it was once enriched. Other interesting buildings are the bishop's palace, the deanery, the King's house, the hall of John Halle, and the Poultry Cross with six arches built in 1330. There are a fine museum, several important educational institutions, and many charities. The town maintains its water supply, markets, river baths, technical school, public library, sewage farm, and two cemeteries. The trade is chiefly agricultural; cutlery and woolen manufactures, formerly important, are abandoned. Population, in 1891, 15,500; in 1901, 17,100. Consult White, *Salisbury Cathedral* (London, 1896).

SALISBURY. A town in Litchfield County, Conn., 63 miles northwest of Hartford; on the Housatonic River, and on the Philadelphia, Reading and New England Railroad (Map: Connecticut, B 2). It is attractively situated in a region noted for its numerous lakes and the general beauty of its scenery. It has a State School for Imbeciles, Hotchkiss School for Boys, and the Scoville Memorial Library, with over 6000 volumes. Iron-mining and farming are important industries; and there are manufactures of cutlery, cutlery handles, car wheels, and various foundry products. Population, in 1890, 3420; in 1900, 3489. Settled in 1722, and laid out ten years later, Salisbury was incorporated as a town in 1741. Ethan Allen lived here for some years prior to the Revolution. Consult Rudd, *An Historical Sketch of Salisbury* (New York, 1899).

SALISBURY. A town and the county-seat of Wicomico County, Md., 100 miles southeast of Baltimore; on the Wicomico River and on the Baltimore, Chesapeake and Atlantic and the New York, Philadelphia and Norfolk railroads (Map: Maryland, P 7). It has large lumber interests, repair shops of the Baltimore, Chesapeake and Atlantic Railroad, and extensive canning establishments. Flour, baskets, fertilizers, and lumber products also are manufactured. Under the charter of 1888 the government is vested in a mayor, chosen biennially, and a unicameral council. Population, in 1890, 2905; in 1900, 4277.

SALISBURY. A city and the county-seat of Rowan County, N. C., 118 miles west of Raleigh; on the Southern Railway (Map: North Carolina, B 2). It is the seat of Livingstone College (African Methodist Episcopal Zion), opened in 1882; of the colored State Normal School, and various secondary institutions. The national cemetery here contains 12,145 graves, including 12,035 of unknown dead. Salisbury is in a farming and fruit-growing section, and has shops of the Southern Railway, and manufactories of cotton, hosiery and knit goods, wooden ware, foundry and lumber products, felt mattresses, braided cord, and brick. The water-works are owned by the municipality. A Confederate military prison was situated in Salisbury during the Civil War. Population, in 1890, 4418; in 1900, 6277.

SALISBURY, EDWARD ELBRIDGE (1814-1901). An American Orientalist and philologist, born in Boston. He graduated from Yale in 1832 and after a further course of theology there, studied

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Oriental languages in Paris and Berlin. In 1841 he was appointed professor of Arabic and Sanskrit at Yale. In 1854 he surrendered his Sanskrit work to Whitney, remaining professor of Arabic until 1856. He endowed the Sanskrit professorship of the college, and later gave his Oriental library to the university. He was a prolific contributor on Oriental languages and literatures to the *Journal of the American Oriental Society*, of which he was the leading spirit for many years. Consult Hopkins, *India, Old and New* (New York, 1901).

SALISBURY, Robert Arthur Talbot Gascoyne-Cecil, third Marquis of (1830-1903). An English statesman, born at Hatfield, Hertfordshire, February 3, 1830; a lineal descendant of Lord Burleigh and Robert Cecil, first Earl of Salisbury. He received his bachelor's degree at Christ Church, Oxford, in 1849, and in 1853 was elected fellow of All Souls' College. In the same year he entered Parliament as the representative of Stamford. With the year 1859 he began to be considered as a distinct force among the Conservatives. In 1865 his elder brother died and he became heir to the marquisate and assumed the courtesy title of Viscount Cranborne. In the Derby Ministry of 1866 Lord Cranborne was taken into the Cabinet as Secretary of State for India. He had made a thorough study of the problems which this office presented, but after holding the office for less than a year resigned because of his opposition to the Reform Bill brought in by his colleagues. In 1868 his father died and he was transferred to the House of Lords as Marquis of Salisbury. In 1869 he became chancellor of the University of Oxford. This was a distinct recognition of his attitude toward Church questions, for from his entrance into public life he had been a vigorous defender of the Church of England. From 1868 to 1874, the period of Gladstone's first Ministry, Salisbury was not a very conspicuous figure in politics, but when the Conservatives, under Disraeli, returned to power in 1874, Salisbury again entered the Cabinet as Secretary of State for India. He was almost the only Minister who heartily supported the new Premier's imperialist policy. Because of his agreement with his chief on this point and his knowledge of Eastern affairs, he was chosen in 1876 as the British representative to the Conference of Constantinople, which was called with a view of forcing reforms upon the Porte. Two years later Lord Derby withdrew from the Cabinet and Salisbury took his place as Secretary of State for Foreign Affairs. In this capacity he accompanied Lord Beaconsfield as plenipotentiary to the Congress of Berlin, but gained little glory from the mission, as he seemed to have been entirely subservient to the Premier and his jingo policy. Upon the death of Lord Beaconsfield in 1881 Lord Salisbury was chosen leader of the Conservative Party, and after the resignation of the Gladstone Ministry in June, 1885, became head of the Government, taking for himself the Department of Foreign Affairs. The Conservatives went out of office in January, 1886, only to come back in July, after the adoption of Home Rule by Gladstone had disrupted the Liberal Party, and sent a large faction under Lord Hartington and Joseph Chamberlain into the Conservative ranks. In 1887 Lord Salisbury once more assumed as Premier charge of foreign affairs. He went out of office in 1892 and again returned to power in 1895. In 1900 he was succeeded in the Foreign Office by Lord Lansdowne, remaining, however, at the head of the Cabinet as Lord Privy Seal. On July 11, 1902, Lord Salisbury resigned his office and was succeeded by his nephew, Arthur Balfour. During his long tenure of office Lord Salisbury attained a leading position among European diplomats, his policy being characterized in general by a spirit of moderation which brought him much criticism from those Englishmen who viewed with jealous eyes the development of ambitious world policies by the Continental Powers. Events of international importance in which Lord Salisbury was concerned were the misunderstanding with the United States concerning Venezuela in 1895-96, the adjustment of the difficult question of Crete (1897), as well as the delimitation of the British and German spheres of influence in Africa (1890). Toward the end of his tenure of office Lord Salisbury withdrew somewhat from the public eye, partly as the result of old age, but partly because the militant spirit of the new imperialistic Conversatism found a more aggressive leader in the person of Joseph Chamberlain, who from the outbreak of the South African War was by all odds the most predominating figure in the Cabinet. Lord Salisbury died August 22, 1903. Among English statesmen he ranks high, not for any one great quality or particular achievement, but because of the success that during nearly fifteen years of Imperial rule attended his policy of Conservative caution. In tastes and sentiments an aristocrat, he did not shrink from expressing his disapproval of democracy, in his characteristically cynical but witty fashion. For his biography, consult: Puling (London, 1885); Traill (ib., 1891); Aitkin (ib., 1901); and How (ib., 1902).

SALISBURY, Rollin D. (1859—). An American geologist and educator, born at Spring Prairie, Wis., and educated at Beloit College, where he graduated in 1881. He served for two years as an instructor in the academy attached to Beloit, and from 1884 to 1891 was professor of geology in the college, except during a period of two years (1887-88) spent in foreign study. After a year's service on the faculty of the University of Wisconsin he was called to the chair of geographic geology at the University of Chicago, where in 1898 he was appointed dean of the Ogden School of Science. In 1883 he became connected with the United States Geological Survey, and in 1891 joined the New Jersey Geological Survey with especial charge of the surface geology of that State. Besides the annual reports of the New Jersey Geological Survey from 1882 to 1890 he wrote: *Physical Geography of New Jersey* (1896); *Geography of Chicago and Its Environs* (with W. A. Alden, 1899); *The Geography of the Region Around Devil's Lake and the Dalles of Wisconsin* (with W. W. Atwood, 1900); and *The Driftless Area of Southwestern Wisconsin*, with T. C. Chamberland (*Sixteenth Annual Report of the United States Geological Survey*).

SA'LISH. A North American tribe. See Flathead.

SALISHAN STOCK. An important linguistic group whose tribes, with many dialectic variations, held nearly all the southern half of

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British Columbia, with the opposite coast of Vancouver Island, together with nearly all of northern and western Washington and northwestern Montana and Idaho, besides one or two detached tribes along the Oregon coast. There is also strong probability that the tribes now classed under the Wakashan (q.v.) stock of Vancouver Island, with the more northern Hailtzuk, will ultimately be proved to be of the same connection. They may be classed roughly in two groups: the fishing tribes of the coast and Puget Sound region, and the root and berry gatherers of the interior. Their primitive characteristics were of a very low order. They had no agriculture, and there could hardly be said to have been any form of government. The clan system was unknown. The houses were usually large communal dwellings of split cedar boards. Among the coast tribes the dead were usually laid away in canoes set upon posts in the woods, and slaves were sacrificed near the spot, being sometimes bound and left thus to starve to death. There was constant petty warfare among the various small bands, the weapons being clubs and bows, with protective body armor of toughened hide or strips of wood. Scalping was not practiced, but the slain were frequently beheaded. Head-flattening was common among nearly all the tribes, particularly near the coast, as was also the curious custom of potlatch (q.v.). All the dialects are exceptionally harsh and difficult in pronunciation, and but little study has yet been made of them. The Chinook jargon (q.v.) was also in use as a regular trading medium. The majority of their tribes now retain but few of their aboriginal characteristics. Among the eighty or more tribal divisions may be mentioned the Bellacoola, Clallam, Colville, Flathead or Salish proper, Kalispel, Lake, Lummi, Nisqually, Okinagan, Puyallup, Quinault, Sanpoil, Shushwap, Skokomish, Songeesh, Spokan, Tulalip. Their present numbers are about 20,000, nearly equally divided between the United States and British Columbia.

SALIS-SEEWIS, *Ger. pron.* zä'lês-zä'vês; *Fr.* sä'lēs' sä'vēs', JOHANN GAUDENZ, Baron von (1762-1834). A Swiss poet, born in Bothmar Castle, near Malans, Grisons. In 1779 he went to Paris and entered the Swiss guards, in which he advanced rapidly. He returned to Switzerland in 1793, married the 'Berenice' of his poems, and took a prominent part in Swiss politics, becoming leader of the patriots and inspector-general of their forces. In 1817 he retired to his estate at Malans. His poems were first published in 1793, and a twelfth enlarged edition appeared in 1839. With Matthisson he represents the sentimental nature poets, but ranks as less sentimental, more individual, and more objective than his colleague. His "Silent Land," in Longfellow's translation, is well known to English readers. For his biography, consult Röder (Saint Gall, 1863) and Frey (Frauenfeld, 1889).

SALIVARY GLAND (Lat. *salivarius*, relating to saliva, from *saliva*, spittle; connected with Gk. *σιαλον*, *sialon*, Russ. *slina*, Gael. *seile*, spittle). A gland which conveys certain secretions into the mouth, where, when mixed with the mucus secreted by the mucous membrane, they constitute the ordinary or mixed saliva. There are three pairs of salivary glands: The *parotid gland* is the largest of the three glands occurring on either side. It lies upon the side of the face immediately in front of the external ear, and weighs from half an ounce to an ounce. Its duct is about two inches and a half in length, and opens into the mouth by a small orifice opposite the second molar tooth of the upper jaw. The walls of the duct are dense and somewhat thick, and the caliber is about that of a crow-quill. (For structure, see GLAND.) The *submaxillary gland* is situated, as its name implies, below the jaw-bone, and is placed at nearly equal distances from the parotid and sublingual glands. Its duct is about two inches in length, and opens by a narrow orifice on the top of a papilla, at the side of the frænum of the tongue. The *sublingual gland* is situated, as its name implies, under the tongue, each gland lying on either side of the frænum of the tongue. It has a number of excretory ducts, which open separately into the mouth.

True salivary glands exist in all mammals except the Cetaceæ, in birds and reptiles (including amphibians), but not in fishes; and glands discharging a similar function occur in insects, many mollusks, etc. In insects and vertebrates this fluid is chiefly diastatic in character, changing starch to sugar. In mollusks an œsophageal gland, called 'salivary,' secretes an acid fluid, which, like the hydrochloric acid of the vertebrate stomach, is chiefly antiseptic in its function. Certain special glands pour their secretions into the buccal cavity, such as the spinning-glands of caterpillars and the glands of the swifts (q.v.) that supply the material of their nests. For the chemical and physical characters of the saliva, see DIGESTION.

The most common disease of the parotid is the specific inflammation commonly known as mumps (q.v.). These glands may also become acutely inflamed during some of the infectious diseases (e.g. scarlet fever, smallpox, or typhoid), and in these cases they readily go on to suppuration, requiring early incision. Many of the tumors develop in this site, some of great malignancy, and they present serious difficulties to operative interference. The facial nerve is especially liable to injury during operation, with resulting facial paralysis. At times the excreting duct becomes occluded by a calculus and a troublesome salivary fistula follows unless it is promptly removed. Increase of secretion, deficiency of secretion, or an acid or fetid change present annoying complications in different diseases. See SALIVATION.

SALIVATION (Lat. *salivatio*, from *salivare*, to spit, from *saliva*, spittle), or PTYALISM. An excessive secretion of saliva, due to irritation of the salivary glands, and usually attended with soreness and swelling of the mucous membranes of the mouth and throat. It is commonly induced by mercury or its compounds in excessive and long continued dosage, but may arise from other drugs, notably pilocarpine, potassium iodide, muscarine, cantharides, copper, gold, and tobacco. Certain diseases also are provocative of an increased salivary flow, among which may be mentioned parotitis, quinsy, hydrophobia, scurvy, hysteria, stomatitis, trigeminal neuralgia, and dental irritations, including the process of dentition itself. It is an occasional phenomenon of pregnancy and menstruation. Apparent sali-

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vation may occur in facial paralysis, diphtheritic paralysis, chronic bulbar palsy, and idiocy; this is due rather to an inability to retain the secretion than to overproduction. When due to mercury, salivation is manifested by a metallic taste, a foul-smelling breath, and tenderness on pressure of the jaws and teeth. The gums and tongue are red and swollen, the latter coated heavily and showing the imprint of the teeth. In severe cases the gums may bleed and ulcerate, the teeth become loosened, and the cheeks and mouth become gangrenous. Pain, sleeplessness, fever, and constitutional depression may be extreme. For the treatment of mercurial salivation, see MERCURY and SYPHILIS.

SALLE, sȧl, JEAN BAPTISTE DE LA. See LA SALLE.

SALLEE, sȧ-lē', or **SLA**. A seaport of Morocco, situated at the mouth of the Bu Regreb, opposite Rabat (Map: Africa, D 1). It is noted for its fine carpets. The chief export is wool. Sallee was formerly notorious as the haunt of pirates. Population, about 10,000.

SALLOW. A popular name for various species of willow.

SAL'LUST (GAIUS SALLUSTIUS CRISPUS) (B.C. 86-34). A Roman historian, born at Amiternum, in the Sabine country. Though of a plebeian family, he rose to official distinction, first as quæstor about B.C. 59, and afterward as tribune of the people in 52, when he joined the popular party against Milo, who in that year had killed Clodius. His reputation for morality was never high; and his intrigue with Milo's wife is assigned as the cause of his being expelled in 50 from the senate, although his attachment to Cæsar's party is a more plausible reason of his expulsion. In the Civil War he joined the camp of Cæsar; and in 47, when Cæsar's fortune was in the ascendent, he was made prætor-elect, and was consequently restored to his former rank. When in Campania, at the head of some of Cæsar's troops, who were about to be transported to Africa, he nearly lost his life in a mutiny. In 46, however, we find him engaged in Cæsar's African campaign, at the close of which he was left as Governor of Numidia. His administration was sullied by various acts of oppression, particularly by his enriching himself at the expense of the people. He was, for these offenses, accused before Cæsar, but seems to have escaped being brought to trial. His immense fortune, so accumulated, enabled him to retire from the prevailing civil commotion into private life, and devote his remaining years to those historical works on which his reputation rests. He died in B.C. 34. His histories, which seem to have been begun only after his return from Numidia, are: First, the *Catilina* or *Bellum Catilinarium*, descriptive of Catiline's conspiracy in 63; second, the *Jugurtha*, or *Bellum Jugurthinum*, describing the war between the Romans and Jugurtha, the King of Numidia. These, the only genuine works of Sallust which have reached us entire, are of great but unequal merit. The quasi-philosophical reflections which are prefixed to them are of no value, but the histories themselves are powerful and animated, and contain effective speeches of his own composition, which he puts into the mouths of his chief characters. With its literary excellence, however, the value of the *Jugurtha* stops, as in military, geographical, and even chronological details, it is very inexact. Of Sallust's lost work, *Historiarum Libri Quinque*, only fragments exist, some of which were found as late as 1886. Sallust has the merit of having been the first Roman who wrote what we now understand by history. The most convenient edition of the complete text of Sallust's works is that of Eussner (Leipzig, 1893). There are also good editions by Jordan (Berlin, 1887) and Dietsch (Leipzig, 1884); and of the *Catiline* and *Jugurtha* by Capes (Oxford, 1884). The most accessible translations are those of Watson (New York, 1859) and Mongan (1864).

SALLUST, GARDENS OF. The beautiful gardens laid out by the historian Sallust on the Quirinal Hill, later the favorite residence of several Roman emperors, who adorned them with magnificent works of art. The gardens survived until recently where the Villa Massimi stood.

SALLY-PORT. In fortification, usually a cutting made through the glacis by which a sally may be made from the covered way. The term has also been applied to the postern leading from under the rampart into the ditch. The sally-port was an important feature of all the old castles and fortified buildings of Europe. See FORTIFICATION.

SALMASIUS, sȧl-mā'shi-ŭs, CLAUDIUS, or CLAUDE DE SAUMAISE (1588-1655). A French classical scholar and Protestant, born April 15, 1588, at Sémur-en-Auxois, France. After studying at Paris and Heidelberg he was made professor at Leyden (1631), but, in part because of the sensation caused by his *Defensio regia pro Carolo I.* (1649) and Milton's fierce rejoinder, he accepted an invitation to Stockholm (1650), whence he returned in 1651 with shattered health to Leyden. He died September, 1655, at Spa. Salmasius had immense but ill-digested learning. He was a great encyclopædist, but with little method, and weak as a textual critic. He is remembered for his discovery of the Greek *Anthology* of Kephalas at Heidelberg (1606), for editions of *Scriptores Historiæ Augustæ* (1620), and for *Plinianæ Exercitationes in Solinum* (1629), *De Lingua Hellenistica* (1643), *De Usuris* (1638), and *De Re Militari Romanorum* (1657). Salmasius's *Life and Letters* appeared at Leyden (1656). Consult: Masson, *Life of Milton*, vol. iv. (London, 1858-79); Creuzer, *Opuscula Selecta*, vol. ii. (Leipzig, 1854); and Saxius, *Onomasticon*, vol. iv. (Utrecht, 1775-83).

SALMON (OF., Fr. *saumon*, from Lat. *salmo*, salmon, leaper, from *salire*, Gk. ἅλλεσθαι, *hallesthai*, to leap). A large fish (*Salmo salar*) of the northern oceans, ascending rivers annually to spawn. The name 'salmon' is also used for other more or less closely related species, and it gives the name to a family, the Salmonidæ, to which salmon, trout, whitefish, and various related forms of fishes belong. Although a small family, comprising less than 100 species, this group stands first in popular interest from almost every point of view. The following are the chief external characters of the salmon family:

Body oblong or moderately elongate, covered with cycloid scales of varying size. Head naked. Mouth terminal or somewhat inferior, varying considerably among the different species, those having the mouth largest usually having also the strongest teeth. (See illustration under FISH.) Maxillary provided with a supplemental bone,

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and forming the lateral margin of the upper jaw. Pseudobranchiæ present. Gill-rakers varying with the species. Opercula complete. No barbels. Dorsal fin of moderate length, placed near the middle of the length of the body. Adipose fin well developed. Caudal fin forked. Anal fin moderate or rather long. Ventral fins nearly median in position. Pectoral fins inserted low. Lateral line present. Outline of belly rounded. Vertebræ in large number, usually about 60. Skeleton not strongly ossified. The stomach in all the Salmonidæ is siphonal, and at the pylorus are many (15 to 200) comparatively large pyloric cæca. The air-bladder is large. The eggs are usually much larger than in fishes generally, and the ovaries are without special duct, the ova falling into the cavity of the abdomen before exclusion. The large size of the eggs, their lack of adhesiveness, and the readiness with which they may be impregnated, render the Salmonidæ peculiarly adapted for artificial culture.

The Salmonidæ belong to the order of Isospondyli, the most primitive and least specialized of the orders of Teleostei or bony fishes. In their group, these fishes represent a high degree of development, adaptation to swift rivers and the need of complex instincts. The Salmonidæ are peculiar to the North Temperate and Arctic regions, and within this range they are almost equally abundant wherever suitable waters occur. Some of the species, especially the larger ones, are marine and anadromous, living and growing in the sea, and ascending fresh waters to spawn. Still others live in running brooks, entering lakes or the sea when occasion serves, but not habitually doing so. Still others are lake fishes, approaching the shore or entering brooks in the spawning season, at other times retiring to waters of considerable depth. Some of them are active, voracious, and gamy; while others are comparatively defenseless, and will not take the hook. They are divisible into 10 easily recognized genera—Coregonus, Argyrosomus, Plecoglossus, Brachymystax, Stenodus, Hucho, Oncorhynchus, Salmo, Cristivomer, and Salvelinus.

The Atlantic salmon (*Salmo salar*) is the most familiar, although commercially not the most important of the various species properly called salmon. It is the only black-spotted salmonoid found on the Atlantic seaboard of America. (For illustration, see Colored Plate of AMERICAN FOOD FISHES, accompanying article FISH AS FOOD.) In Europe, where black-spotted trout (*Salmo fario*) and salmon trout (*Salmo trutta*) also occur, the true salmon may be distinguished by the fact that the teeth on the shaft of the vomer mostly disappear with age. From the only other species (*Salmo trutta*) positively known which shares this character, the salmon may be known by the presence of but 11 scales between the adipose fin and the lateral line.

The salmon of the Atlantic is, as already stated, an anadromous fish, spending most of its life in the sea, and entering the streams in the fall for the purpose of reproduction. The time of running varies much in different streams and also in different countries. As with the Pacific species, these salmon are not easily discouraged in their progress, leaping cascades 10 or 12 feet in height, and other obstructions; or, if these prove impassable, dying after repeated fruitless attempts. The young salmon, or 'parr,' is hatched in the spring. It usually remains about two years in the rivers, descending at about the third spring to the sea, when it is known as 'smolt.' The dusky cross-shades found in the young salmon or parr are characteristic of the young of nearly all the Salmonidæ. In the sea it grows much more rapidly, and becomes more silvery in color, and is known as 'grilse.' The grilse rapidly develop into the adult salmon; and some of them, as is the case with the grilse of the Pacific salmon, are capable of reproduction. After spawning, the salmon are very lean and unwholesome, in appearance, as in fact, and are then known as 'kelts.' The Atlantic salmon does not ascend rivers to any such distances as those traversed by the quinnat and the blue-back; its kelts for the most part survive the act of spawning. As a food-fish, the Atlantic salmon is similar to the quinnat salmon, although rather less oily. The average weight of the adult is probably less than 15 pounds. The largest one recorded was taken on the coast of Ireland in 1881, and weighed 84¾ pounds.

The salmon is found in Europe between the latitudes of 45° and 75°. In the United States it is now rarely seen south of Cape Cod, although formerly the Hudson and numerous other rivers were salmon streams. The land-locked forms of salmon, abundant in Norway, Sweden, Maine, and Quebec, which cannot, or at least do not, descend to the sea, should probably not be considered as distinct species. Comparison has been made of numerous specimens of the common land-locked salmon (*Salmo salar*, var. *sebago*) from the lakes of Maine and New Brunswick with land-locked salmon (*Salmo salar*, var. *hardini*) from the lakes of Sweden, and with numerous migratory salmon, both from America and Europe. While showing minor distinctions, especially in size and habit, they are structurally identical. The differences are not greater than would be expected on the hypothesis of recent adaptation of the salmon to lake life. We have, therefore, on our Atlantic coast but one species of salmon (*Salmo salar*).

The numerous other species of the genus Salmo are usually known as 'trout,' although, except for the better development of the vomer and greater backward extension of the series of teeth upon it, there is no technical character of any importance to distinguish the Atlantic salmon from the true, or black-spotted trout. But the salmon reaches a larger size than any of these, and it is regularly anadromous. On the other hand, the running of trout up the rivers to spawn is irregular, and most individuals are land-locked, as are also certain dwarf varieties of the salmon (as the Sebago salmon and the ouananiche of Saint John's River, Quebec).

Most trout, however, enter the sea when they can. These sea-run individuals often grow large and look like salmon, and, like the salmon, they enter the rivers to spawn. They do not, however, ascend the streams with as much energy, nor do they go as far, the instinct in these respects being much less perfect. To the large species entering the sea, intermediate in structure between trout and salmon, the name 'salmon-trout' is applied in England. The species so named (*Salmo trutta*) is considered by some as doubtfully distinct from the ordinary brown trout of Europe (*Salmo fario*). Other species which may be properly called salmon-trout, hav-

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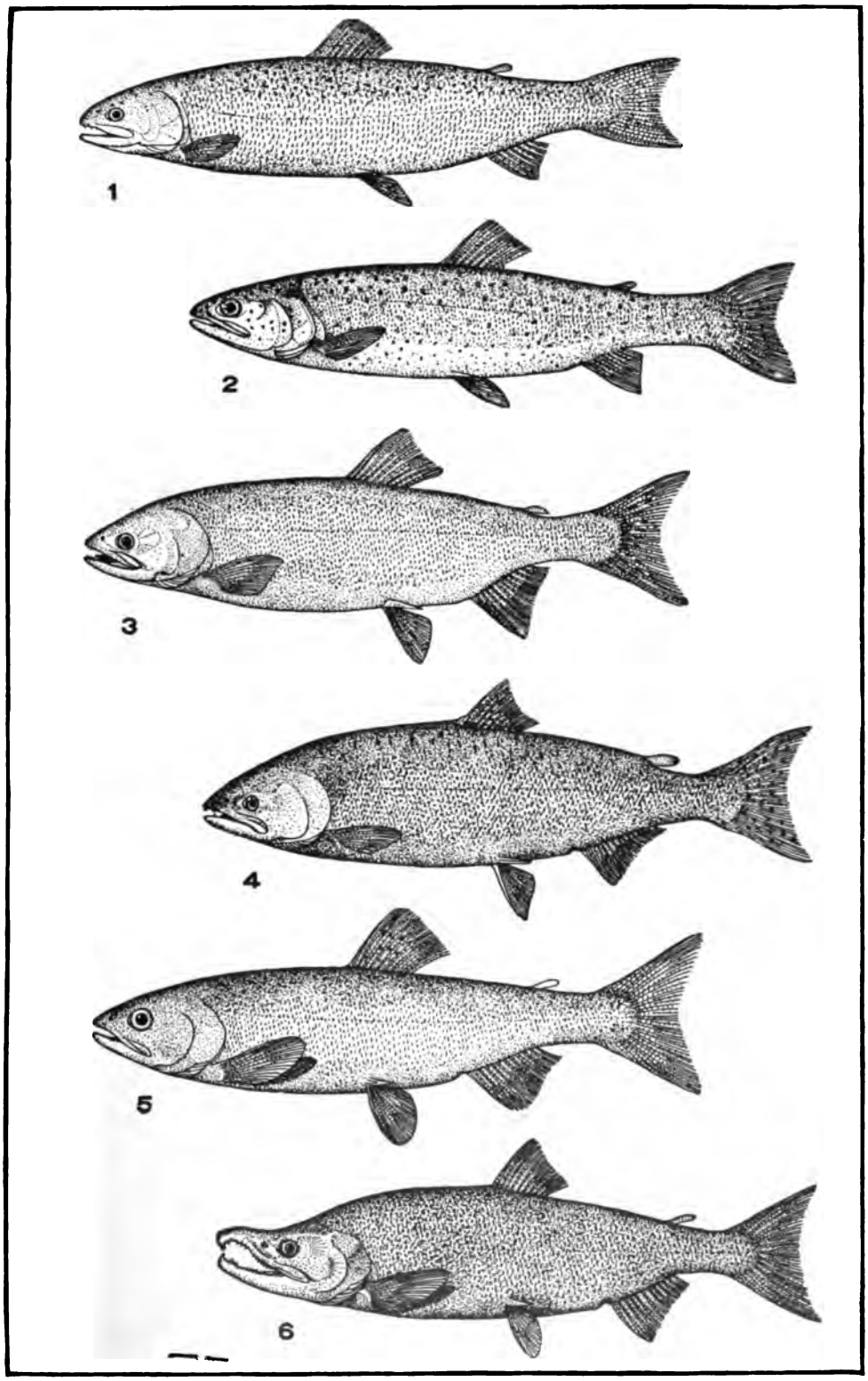
SALMON AND TROUT (WESTERN)



1. SALMON-TROUT or STEELHEAD (Salmo Gairdneri).
2. COLUMBIA RIVER TROUT (Salmo mykiss, var. Clarkii).
3. HUMPBACK SALMON (Oncorhynchus gorbuscha).
4. QUINNAT SALMON (Oncorhynchus tschawytscha).
5. BLUEBACK SALMON (Oncorhynchus nerka); female.
6. BLUEBACK; old male in breeding dress.

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ing the size, appearance, and habits of *Salmo trutta*, are the steelhead of California and Oregon (*Salmo Gairdneri*), the kawamasu of Japan (*Salmo Perryi*), and the mykiss of Kamchatka (*Salmo mykiss*). These differ in no important respect from ordinary black-spotted trout, and the young in the rivers are known as 'trout.' Indeed, it is not certain that the various species of trout are not originally land-locked salmon-trout, and it is probable that a change of environment of relatively few years might transform the one into the other. This remark does not apply to the red-spotted forms known as 'charr' in England and as 'brook trout' or 'speckled trout' in America. These belong to a distinct genus, Salvelinus. See TROUT.

The salmon of the Pacific diverge considerably from the Atlantic salmon, and still more from the forms called 'trout.' The six known species of these fishes are placed in a distinct genus, Oncorhynchus, which agrees with Salmo in general characters, and in the structure of its vomer, but differs anatomically in the increased number of anal rays, branchiostegals, pyloric cæca, and gill-rakers. The species of Oncorhynchus differ, further, in their highly specialized reproductive instincts, all individuals, male and female, dying after spawning. The character most convenient for distinguishing Oncorhynchus, young or old, from all the species of Salmo is the number of developed rays in the anal fin. These in Oncorhynchus are 13 to 20, in Salmo 9 to 12.

The species of Oncorhynchus, anadromous salmon confined to the North Pacific, was first made known in 1768 by that most exact of early observers, Steller, who described and distinguished them with perfect accuracy, under their Russian vernacular names. These Russian names were in 1792 adopted by Walbaum as specific names in a scientific nomenclature; and the six species of Pacific salmon may be called: (1) Quinnat, Chinook, or king salmon (*Oncorhynchus tschawytscha*); (2) red salmon, blueback, or sukkegh (*Oncorhynchus nerka*); (3) silver salmon or coho (*Oncorhynchus kisutch*); (4) dog salmon, calico salmon, or haiko, the sakê of Japan (*Oncorhynchus keta*); (5) humpback or pink salmon (*Oncorhynchus gorbuscha*); (6) masu (*Oncorhynchus masou*) of Japan. These species, in all their varied conditions, may usually be distinguished by the characters given below.

The quinnat salmon (*Oncorhynchus tschawytscha*) has an average weight of 22 pounds, but individuals weighing 70 to 100 pounds are occasionally taken. It has about 16 anal rays, 15 to 19 branchiostegals, 23 (9 + 14) gill-rakers on the anterior gill arch, and 140 to 185 pyloric cæca. The scales are comparatively large, there being from 130 to 155 in a longitudinal series. In the spring the body is silvery, the back, dorsal fin, and caudal fin having more or less of round black spots, and the sides of the head having a peculiar tin-colored metallic lustre. In the fall the color is often black or dirty-red, and the species can then only be distinguished from the dog salmon by its technical characters.

The blue-back salmon (*Oncorhynchus nerka*) usually weighs from five to eight pounds. It has about 14 developed anal rays, 14 branchiostegals, and 75 to 95 pyloric cæca. The gill-rakers are more numerous than in any other salmon, usually about 39 (16 + 23). The scales are larger, there being 130 to 140 in the lateral line. In the spring the form is plumply rounded, and the color is a clear bright blue above, silvery below, and everywhere immaculate. Young fishes often show a few round black spots, which disappear when they enter the sea. Fall specimens in the lakes are bright red in color, hook-nosed and slab-sided, and bear little resemblance to the spring run. Young spawning male grilse are also peculiar in appearance, and were for a time considered as forming a distinct genus. This species appears to be sometimes land-locked in mountain lakes, in which case it reaches but a small size, and is called 'koko' by the Indians.

The silver salmon (*Oncorhynchus kisutch*) reaches a weight of three to eight pounds. It is silvery in spring, greenish above, and with a few faint black spots on the upper parts only. In the fall the males are mostly of a dirty red. The dog salmon (*Oncorhynchus keta*) reaches an average weight of about nine pounds. In spring it is dirty silvery, immaculate, or sprinkled with small black specks, the fins dusky. In the fall the male is brick-red or blackish, and its jaws are greatly distorted. The humpback salmon (*Oncorhynchus gorbuscha*) is the smallest of the species, weighing from three to six pounds. Its scales are much smaller than in any other salmon. In color it is bluish above, the posterior and upper parts with many round black spots. The masu (*Oncorhynchus masou*) is thus far known only from the rivers of Northern Japan. It is very much like the humpback salmon, but may be known at sight by the absence of black spots on its tail.

The blueback abounds in Fraser River and in all the streams of Alaska; the silver salmon in Puget Sound; the quinnat in the Columbia and the Sacramento; and the dog salmon in some of the streams to the northward and especially in Japan. All of the five American species have been seen in the Columbia and Fraser rivers; all but the blueback in the Sacramento, and all in waters tributary to Puget Sound. Only the quinnat has been noticed south of San Francisco, as far as Carmelo River. The king salmon and blueback habitually 'run' in the spring, the others in the fall. The usual order of running in the rivers is as follows: *tschawytscha*, *nerka*, *kisutch*, *gorbuscha*, *keta*. The economic value of the spring-running salmon is far greater than that of the other species, because they can be captured in numbers when at their best, while the others are usually taken only after deterioration. To this fact the worthlessness of *Oncorhynchus keta*, as compared with the other species, is partly due. Its flesh at the best, however, is soft and mushy.

The habits of the salmon in the ocean are not easily studied. King salmon and silver salmon of all sizes are taken with the seine at almost any season in Puget Sound; this would indicate that these species do not go far from the shore. The king salmon takes the hook freely in Monterey Bay, both near the shore and at a distance of six to eight miles out. We have reason to believe that these two species do not necessarily seek great depths, but probably remain not very far from the mouth of the rivers in which they were spawned. The blueback and the dog salmon probably seek deeper water, as the former is seldom taken with the seine in the ocean, and the latter is known to enter the Straits of Fuca at the spawning season, therefore coming in from

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the open sea. The run of the king salmon begins generally at the last of March; it lasts, with various modifications and interruptions, until the actual spawning season, August to November, the time of running and the proportionate amount in each of the subordinate runs varying with each different river. In the Sacramento the run is greatest in the fall, and greater in the summer than in spring. The spring salmon ascend only those rivers which are fed by the melting snows from the mountains, and which have sufficient volume to send their waters well out to sea. Those salmon which run in the spring are chiefly adults (supposed to be mostly four years old). It would appear that the contact with cold fresh water, when in the ocean, in some way causes them to run toward it, and to run before there is any special influence to that end exerted by the development of the organs of generation. High water on any of these rivers in the spring is always followed by an increased run of salmon. The manner of spawning is probably similar for all the species. Usually the fishes pair off; the male, with tail and snout, excavates a broad, shallow 'nest' in the gravelly bed of the stream, in rapid water, at a depth of one to four feet; the female deposits her eggs in it, and after the exclusion of the milt the pair cover them with stones and gravel. They then float down the stream tail foremost, never swimming down stream or making any effort to reach the sea. In the course of from a day to a week or two all of them, both males and females, die, regardless of the distance of their spawning beds from the sea. The young hatch in from 120 to 180 days.

The salmon of all kinds in the spring are silvery, and the mouth is about equally symmetrical in both sexes. As the spawning season approaches the female loses her silvery color, becomes more slimy, the scales on the back partly sink into the skin, and the flesh changes from salmon-red, and becomes variously paler from the loss of oil, the degree of paleness varying much with individuals and with inhabitants of different rivers. In the Sacramento the flesh of the quinnat, in either spring or fall, is rarely pale. In the Columbia a few with pale flesh are sometimes taken in spring, and a good many in the fall. In Fraser River the fall run of the quinnat is nearly worthless for canning purposes, because so many are 'white-meated.' In the spring very few are 'white-meated,' but the number increases toward fall, when there is every variation, some having red streaks running through them, others being red toward the head and pale toward the tail. The red and pale ones cannot be distinguished externally, and the color is dependent upon neither age nor sex. There is not much difference in the taste, but there is no market for pale-fleshed salmon.

As the season advances, the difference between the males and females becomes more and more marked, and keeps pace with the development of the milt, as is shown by dissection. The males have (1) the premaxillaries and the tip of the lower jaw more and more prolonged, both of the jaws becoming finally strongly and often extravagantly hooked, so that either they shut by the side of each other like shears, or else the mouth cannot be closed. (2) The front teeth become very long and canine-like, their growth proceeding very rapidly, until they are often one-half inch long. (3) The teeth on the vomer and tongue often disappear. (4) The body grows more compressed and deeper at the shoulders, so that a very distinct hump is formed; this is more developed in the humpback and dog salmon, but is found in all. (5) The scales disappear, especially on the back, by the growth of spongy skin. (6) The color changes from silvery to various shades of black and red, or blotchy, according to the species. The distorted males are commonly considered worthless, rejected by the canners and salters, but are preserved by the Indians. These changes are due solely to influences connected with the growth of the reproductive organs. They are not in any way due to the action of fresh water. They take place at about the same time in the adult males of all species, whether in the ocean or in the rivers. At the time of the spring runs all are symmetrical. In the fall all males, of whatever species, are more or less distorted.

As already stated, the economic value of any species depends in great part on its being a 'spring salmon.' It is not generally possible to capture salmon of any species in large numbers until they approach the rivers, and the spring salmon enter the rivers long before the growth of the organs of reproduction has reduced the richness of the flesh. The fall salmon cannot be taken in quantity until their flesh has deteriorated; hence, the dog salmon is practically almost worthless, except to the Indians, and the humpback is little better. The silver salmon, with the same breeding habits as the dog salmon, is more valuable, as it is found in the inland waters of Puget Sound for a considerable time before the fall rains cause the fall runs, and it may be taken in large numbers with seines before the season for entering the rivers. The quinnat or Chinook salmon, from its great size and abundance, is more valuable than all the other fishes on our Pacific coast outside of Alaska taken together. The blueback, a little inferior in flesh, much smaller and far more abundant when Alaska is considered, is worth more than the combined value of the three remaining species of salmon. The pack of blueback salmon for 1903 is valued at $8,000,000, the catch of the quinnat at nearly $4,000,000.

The fall salmon of all species, but especially of the dog, ascend streams but a short distance before spawning. They seem to be in great anxiety to find fresh water, and many of them work their way up little brooks only a few inches deep, where they perish miserably, floundering about on the stones. It is the prevailing impression that the salmon have some special instinct which leads them to return to spawn on the grounds where they were originally hatched, but there is no evidence of this. It seems more probable that the young salmon hatched in any river mostly remain in the ocean within a radius of 20 to 100 miles of its mouth. These, in their movements about in the ocean, may come into contact with the cold waters of their parent river, or perhaps of any other river, at a considerable distance from the shore. In the case of the quinnat and the blueback, their 'instinct' seems to lead them to ascend these fresh waters, and in a majority of cases these waters will be those in which the fishes in question were originally spawned. Later in the season the growth of the reproductive organs leads them to approach the shore and search for fresh waters, and still the chances are

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that they may find the original stream. But undoubtedly many fall salmon ascend, or try to ascend, streams in which no salmon were ever hatched.

Commercially speaking, the two principal species of Pacific salmon are unquestionably the most valuable fishes in the world. The market value of the entire salmon catch on the West coast of the United States, including Alaska, has reached nearly $20,000,000 annually, and this vast amount is represented chiefly by the two species, the Chinook and blueback, the catch of the four other species being in comparison insignificant. The annual catch of salmon in Puget Sound has reached to more than $4,000,000, and consists chiefly, as in Alaska, of bluebacks. The run of quinnats begins in the Columbia River as early as February or March. At first the fishes travel leisurely, moving up only a few miles each day. As they go farther and farther up-stream they swim rather more rapidly. Those that enter the river first are the ones which will go farthest toward the headwaters, many of them going to spawning beds in the Salmon River in the Sawtooth Mountains of Idaho, more than 1000 miles from the sea. In the Yukon the quinnat ascends to Caribou Crossing, 2250 miles from the sea. Those which go to the headwaters of the Snake River in the Sawtooth Mountains spawn in August and early September; those going to the Big Sandy in Oregon, in July and early August; those going up the Snake River to Upper Salmon Falls, in October; while those entering the small lower tributaries of the Columbia or the small coastal streams spawn even as late as December. Observations made at various places indicate that whatever the spawning beds may be, spawning will not begin until the temperature of the water has fallen to 54° F. If the fish reach the spawning grounds when the temperature is above 54°, they wait until the water cools down to the required degree. The spawning act extends over several days.

It has been often stated and generally believed that the salmon receive many injuries by striking against rocks and in other ways while en route to their spawning grounds, and as a result from these injuries, those which go long distances from the sea die after once spawning. An examination of many salmon at the time of arrival on their spawning beds in central Idaho showed most fishes to be entirely without mutilations of any kind, and apparently in excellent condition. Mutilations, however, soon appeared, resulting from abrasions received on the spawning beds while pushing the gravel about or rubbing against it, and from fighting with each other, which is sometimes quite severe. See illustration under DOG SALMON.

The blueback salmon is found from the coast of southern Oregon northward, especially in the Columbia, Quinialt, and Skagit rivers. It enters the Fraser in enormous numbers, and is by far the most abundant and valuable salmon in Alaska. In the Columbia River it is called 'blueback;' in the Fraser it is the 'sockeye,' 'sawkeye,' or 'sau-qui;' in Alaska it is the red salmon or 'redfish;' while among the Russians it is the 'krasnaya ryba.'

The death of all the individuals of all the species of the West coast salmon after once spawning is in no manner determined by distance from the sea. The cause is deep-seated in its nature and general in its application, and the same as that which compasses the death of the Ephemera or May-fly after an existence of but a few hours, or of all annual plants at the end of one season.

Other groups within the Salmonidæ are elsewhere considered, under CHAR, TROUT, WHITEFISH, and certain speecific names, as CISCO, NAMAYCUSH, etc.

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See Colored Plate of FOOD-FISHES; Plate of SALMON AND TROUT.

SALMON, sä'mŭn, GEORGE (1819-1904). An Irish mathematician and divine, born in Dublin. He was educated at Trinity College in that city, where he became a fellow at the age of twenty. He took orders, and in 1866 became professor of theology. He wrote extensively on theology, his works including an *Introduction to the Study of the New Testament* (7th ed. 1894); *Non-miraculous Christianity* (2d ed. 1888); and *The Infallibility of the Church* (2d ed. 1891). But he is best known for his masterly treatises on mathematics, his text-books being the most advanced that have appeared in English in his generation. These works are: *Treatise on Conic Sections* (6th ed. 1879); *Treatise on Higher Plane Curves* (3d ed. 1879); *Treatise on Analytic Geometry* (1848); *Treatise on Analytic Geometry of Three Dimensions* (4th ed. 1882); *Lessons Introductory to the Modern Higher Algebra* (1859; 4th ed. 1885). These mathematical works have been translated into several languages, and the German editions of Fiedler are especially well known.

SALMOND, sä'mond, STEWART DINGWALL FORDYCE (1838-1905). A Scotch educator, born at Aberdeen. He was educated at the University and Free Church College, Aberdeen, and at Erlangen University, and was assistant professor of Greek and examiner in classics at Aberdeen University from 1861 until 1867. In 1876 he became professor of systematic theology and exegesis of the Epistles in the United Free Church College, Aberdeen, and he was made principal of the college in 1898. His original works include: "Commentary on the Epistle of Peter," in *Schaff's Popular Commentary* (1883); "Commentary on the Epistle of Jude," in *Pulpit Commentary* (1889); *The Christian Doctrine of Immortality* (1895); and he also prepared translations of many of the minor Latin writers.

SALMON DANCE. A dance of the Karok, Yurok, and Tolowa tribes of American Indians, held in the spring when the salmon begin to run up the rivers. The chief actor is an Indian who is deputized to retire into the mountains and perform a two days' fast, while the people dance. On his return, gaunt from fasting, the people hide themselves, believing that to look upon him

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would be death, while he goes to the river, takes a salmon, eats a portion, and with the remainder kindles a sacred fire in the sweat-house. No man may catch a salmon before the dance nor for ten days afterwards, even in case of extreme necessity.

SALMO'NEUS (Lat., from Gk. Σαλμωνεύς). A king of Elis who wished to be thought a god, and imitated Jove's thunder by driving his chariot over a brazen bridge, and lightning by torches hurled in all directions. For this impiety he was killed by lightning.

SALMON FISHING. This sport demands the exercise of all the skill and experience which the experienced angler may possess. It is universally admitted that of all the delights of an angler's experience there is nothing comparable with that of rising and hooking a salmon. A first essential is the knowledge of the habits of the fish and the position of rod and tackle that will be equal to the strength and courage of the salmon. No arbitrary rule can be laid down in the selection of a rod, as much will depend upon the skill, strength, and experience of the fisherman; usually, a 17-foot rod is considered long enough for ordinary casting. A moderately thick line will be required if a powerful rod is employed. A casting line, i.e. the gut line connecting the reel line with the fly, must be selected according as the water is clouded or clear, a finer line being selected for the clearer water. It is in the selection of flies that the greatest differences of opinion exist regarding salmon fishing. Some anglers employ different patterns for every month of the fishing season, others certain patterns or types for certain localities, while still others believe that certain shades of color are necessary for certain days. The consensus of opinion seems to be that the question of color is more important than that of pattern. There is almost as much divergence of opinion regarding hooks, a question which, like that of 'flies,' must be left to the choice of the angler. From the casting of the fly to the gaffing and landing of the fish no definite rule may be said to apply. Consult Cholmondeley-Pennell, *Fishing*, in the Badminton Library (London, 1885). See FLY-CASTING; FISHING.

SALMON-KILLER. See STICKLEBACK.

SALMON RIVER. A stream of Idaho. It rises in the Sawtooth Mountains, in the south central part of the State, and after a circuitous, mainly westward, course, empties into the Snake River, 50 miles above Lewiston (Map: Idaho, A 3). It is about 400 miles long, and throughout its length it flows in a deep, cañon-like valley, whose steeply sloping sides rise from 3000 to 4000 feet above it.

SALMON-TROUT. See SALMON.

SALM-SALM, zälm'zälm', FELIX, Prince (1828-70). A German soldier of fortune, born at Anhalt. He was educated at the cadet school near Berlin, and, after serving in the Prussian and Austrian armies, came to the United States in 1861. At the beginning of the Civil War he was appointed to the staff of Gen. Louis Blenker, and later was commissioned colonel of the Eighth New York Volunteers, a German regiment. In 1864 he was appointed to the command of the Sixty-eighth New York Volunteers, and the next year was made brigadier-general and served as post commander at Atlanta. At the end of the war he went to Mexico, where he became one of Emperor Maximilian's aides and chief of his household. Soon after Maximilian's execution he returned to Europe, reëntered the Prussian service as major in the Grenadier Guards, and was killed at Gravelotte. He published an account of his experiences in *My Diary in Mexico, Including the Last Days of Emperor Maximilian* (1868). Consult Princess Salm-Salm, *Ten Years of My Life* (New York, 1875).

SALOL (from *sal-icyl* + *phen-ol*). The salicylate of phenol, a white crystalline powder, nearly tasteless and odorless, almost insoluble in water, but soluble in alcohol, ether, and chloroform. It is very slightly or not at all dissolved in the stomach, but in the alkaline intestinal secretion is split into 36 parts of phenol and 64 of salicylic acid. This fact is utilized in testing the muscular activity of the stomach. In the healthy stomach salol should pass into the intestine, and after decomposition there appear in the urine as salicyluric acid within one-half to three-quarters of an hour. If this reaction cannot be obtained within an hour after administration of salol there is probably some such condition as dilatation or atony of the stomach. The test for salicyluric acid is the addition to the urine of a few drops of ferric chloride, which gives a reddish-violet color with that acid. The physiological effects of salol are practically the same as those of salicylic acid (q.v.), which is formed by its decomposition in the intestine, but the ringing in the ears and other cerebral symptoms are less marked and frequent, and gastric disturbance is rare on account of its insolubility in the stomach. Aside from these advantages it is inferior to sodium salicylate in the treatment of acute rheumatism. It is of value as an intestinal antiseptic in colitis and similar affections. For the relief of pain it is often combined with phenacetine in cases of influenza.

SALO'ME (Lat., from Gk. Σαλώμη). The name of several women mentioned in later Jewish history or the New Testament. (1) The wife of Alexander Jannæus, King of the Jews B.C. 104-78. When her former husband, Aristobulus I., died she released his brother, Alexander Jannæus, from prison and gave him her hand in marriage. At his death she reigned as Queen until her death in B.C 69. Unlike her husband, she favored the Pharisees, and her prosperous reign was considered by them the golden period of the Maccabean era. (2) A sister of Herod the Great, intensely jealous of any rivalry touching her influence with her brother. She was a wicked, unscrupulous woman, several times married and divorced. (3) The daughter of Herodias, second wife of Antipas, and granddaughter of Herod the Great. Her skillful dancing induced Antipas to make the rash vow that led to the death of John the Baptist (cf. Mark vi. 17 et seq.). She married Aristobulus, one of the numerous descendants of Herod, ruler of Lesser Armenia. (4) Wife of Zebedee and mother of the Apostles James and John. She was one of Jesus' most devoted friends, though somewhat over-ambitious for her sons' advancement in the coming Messianic kingdom. Some suppose that she was sister to Mary, the mother of Jesus (cf. Matt. xx. 20-23; xxvii. 56; Mark xv. 40-41, xvi. 1, and possibly John xix. 25.)

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SALOMON, sä'lō-mŏn, JOHANN PETER (1745-1815). A German-English musician, born at Bonn. When young he was attached to the service of Prince Henry of Prussia, for whom he composed several operas. In 1781 he visited Paris and afterwards London, where he settled for the rest of his life. His series of subscription concerts in London in 1790 were notable. He produced the twelve symphonies of Haydn, known as the "Salomon Set." His compositions include songs, part songs, violin solos, and concertos. Two years before his death he founded the London Philharmonic Society. He was interred in Westminster Abbey.

SALOMON ISLANDS. See SOLOMON ISLANDS.

SAL'OMONS, Sir DAVID (1797-1873). An English merchant, legislator, and writer, born in London, of Jewish parentage. He early engaged in commerce in London, was one of the founders of the London and Westminster Bank in 1832, and was elected a sheriff for London and Middlesex in 1835. As Jews had not formerly been considered eligible for the shrievalty, a special act of Parliament was passed to establish the legality of his election. He was instrumental in securing the passage by Parliament in 1845 of a bill enabling Jews to hold municipal offices, and in 1847 was chosen alderman of Cordwainer ward. In 1851 he was elected as a Liberal to Parliament from Greenwich, but refused to take the prescribed oath. In 1858 the oath prescribed for members of Parliament was altered so that a Jew could take it without violating his conscience, and from 1859 continuously until his death Salomons represented Greenwich. In 1855 he was elected Lord Mayor of London, and in 1869 was created a baronet. His publications include: *A Defense of Joint-stock Banks* (1837); *The Monetary Difficulties of America* (1837); *An Account of the Persecution of the Jews at Damascus* (1840); *Parliamentary Oaths* (1850); and *Alteration of Oaths* (1853).

SALON, sä'lŏn'. A town of the Department of Bouches-du-Rhône, France, 20 miles northwest of Aix. The fourteenth-century Church of Saint Lawrence contains the tomb of the astrologer Nostradamus. Near by, at Lançon, is a Roman camp in good preservation. Olive oil and soap are manufactured, and there is also a trade in almonds. Population, in 1901, 12,872.

SALON (Fr., drawing-room). A room devoted to the reception of company, and hence a periodic reunion for conversational and social purposes. Such reunions have been very common in Paris, and have had a marked influence not only upon literature and manners, but also upon politics. The first salon proper was that of the Hôtel de Rambouillet (q.v.). Immediately after the cessation of political turmoil Mlle. de Scudéry (q.v.) began her famous Saturday evenings in the Rue de Beauce, which were attended by Conrart, Ménage, Balzac, Mme. de la Suze, and Mme. de Sévigné, but were looked down upon by the nobility. The real successor of the Marquise de Rambouillet was Mme. de Sablé, who at her salon succeeded in bringing together the aristocracy of intellect and that of birth. Salons now began to multiply, and the system flourished until the middle of the nineteenth century. In the seventeenth century, besides those already mentioned, the salons of Ninon de l'Enclos and Mme. Scarron (afterwards de Maintenon) were specially famous; in the eighteenth, those of Mme. du Deffand, of Mlle. de Lespinasse, of Mme. Geoffrin, of Mme. de Turpin, of Mme. Necker, and of Mme. Roland; and in the nineteenth, those of Mme. de Staël, of Mme. Récamier, of Mme. Vigée le Brun, of Mme. de Girardin, and of Mme. Mohl were among the most conspicuous. There were salons which were distinctively political, or literary, or philosophic, but the greater number aimed rather at an eclecticism which afforded meeting places for all sorts of talents and all shades of belief or unbelief. Consult: Bassanville, *Les salons d'autrefois* (Paris, 1862-70); Wharton, *Salons Colonial and Republican* (Philadelphia, 1900).

SALON, THE PARIS. The title by which the annual exhibition of paintings, sculpture, engravings, etchings, pastels, and water colors is known, and which is held in the Palais de l'Industrie, Paris, from May 1st to June 22d. The exhibition is open to living artists of whatever nationality, subject to their works meeting with the acceptance of the jury of experts elected by the votes of the exhibitors themselves. Those who have received the requisite number of medals or other recompenses at previous exhibitions are placed *hors concours*, and their works are exempt from examination by the jury. The prizes, consisting of various medals and the Prix de Rome (q.v.), are within the gift of the same jury, and are the object of eager competition.

Annual exhibitions by members of the Royal Academy were first held at the Palais Royal in 1667, and in 1669 they were transferred to the Salon Carré of the Louvre, whence they obtained their name. The Revolution abolished the special privileges of the members of the Royal Academy, and in 1791 opened the doors of the Salon to all French artists. In 1855 the Salon for the first time was held at its present quarters in the Palais de l'Industrie.

Previous to 1872 the Salon was in charge of the artist members of the Institute, but the preponderance of architects among them led the Government, in 1872, to put it in charge of the exhibitors themselves, organized as the Société des Artistes Français. Dissensions consequent upon the awards at the exposition of 1889 resulted in the formation of the Société Nationale des Beaux-Arts, which holds an independent exhibition in the Champs de Mars from May 15th to July 15th each year. The Paris Salon is the precursor of the similar exhibitions in London and elsewhere.

SALO'NA. Now a village in Dalmatia, near Spalato (q.v.); formerly an important city of the Roman Empire. Diocletian was born in it and retired to it after his abdication. Many remains of the Roman occupation have been brought to light in recent years.

SALONIKI, sä'lō-nē'kē (Turk. *Selanik*). The capital of a vilayet of the same name and the second seaport in European Turkey, situated at the northern end of an inlet of the Gulf of Saloniki, about 140 miles south of Sofia (Map: Balkan Peninsula, D 4). It lies partly on the flat coast of the inlet and partly on the slopes of Mount Kissos. It is still partly surrounded by white walls, and is commanded by the citadel of Heptapyrgion or Seven Towers. Saloniki,

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abounding in well-preserved monuments of antiquity, is of great archæological interest. The triumphal arch across the former Via Egnatia is variously ascribed to Constantine and Theodosius, and consists of three archways of brick covered with marble slabs and decorated with bas-reliefs. The other arch, attributed to Vespasian, was demolished in 1867. The portico with caryatides, known as Las Incantadas, is believed to be the entrance to a hippodrome. The walls of the city along the water have been demolished and replaced by a magnificent quay, at the eastern end of which is the White Tower or the Tower of Blood, a remnant of the ancient fortifications.

The mosques of Saloniki are mostly of Byzantine origin and are characterized by great splendor. The Mosque of Saint Sophia is modeled after the famous mosque of the same name in Constantinople, and is crowned by a vast dome with beautiful mosaics. The Rotonda, the former Church of Saint George, also deserves especial mention for its mosaics. Saint Demetrius is interesting for the originality of its interior arrangement.

The principal manufactures are morocco leather and leather products, cutlery and arms, flour, cotton yarn, bricks and tiles, and soap. By its situation Saloniki is remarkably well adapted for a great commercial seaport. The new harbor opened in 1901 is protected by a breakwater over 1800 feet long, and has a quay over 1470 feet long, with a long pier at each end. The chief exports of Saloniki are grain, animals and animal products, silk cocoons, wool, tobacco, opium, manganese, etc. The chief imports are textiles, sugar, coffee, tobacco, chemicals, and iron goods. The commerce of Saloniki (excluding the coasting trade) amounted in 1900 to nearly $18,400,000, of which the exports represented about $6,000,000. The trade is chiefly with Great Britain and Austria-Hungary.

The population is estimated at about 100,000, of whom the Jews form over 50 per cent. and the Mohammedans about one-third. The predominating language is Ladino, a corrupted Spanish, introduced by the Jews.

Saloniki is the ancient Thessalonica (q.v.). Throughout nearly the whole of the Middle Ages it belonged to the Byzantine Empire. It has been in the hands of the Turks since 1430.

SA'LOP. A colloquial name for the English county of Shropshire (q.v.).

SALPA (Lat., from Gk. σάλπη, *salpē*, sort of stock-fish). A barrel-shaped ascidian existing either as small, separate individuals or forming a colony or chain consisting of large individuals. Salpa is pelagic, one species occurring in abundance off the shores of southern New England, while the others mostly live on the high seas all over the tropical and subtropical regions of the globe. The hermaphroditic aggregated or chain salpa differs from the solitary asexual form in being less regularly barrel-shaped and without the two long posterior appendages of the latter. Salpa reproduces parthenogenetically, as in some crustaceans and insects, exhibiting a true case of alternation of generations (q.v.) of the kind called 'metagenesis.' Consult Brooks, "The Genus Salpa," in *Memoirs of the Biological Laboratory of Johns Hopkins University*, vol. ii. (Baltimore, 1893).

SALPÊTRIÈRE, sál'pâ'trê'âr'. An old ladies' home and hospital in Paris. Begun by Louis XIV. in 1656 upon the site of the Petit Arsenal, the Salpêtrière has been added to continually, until to-day the forty-five buildings which cover its grounds accommodate over 5000 people—probably the largest institution of its kind in Europe. A large part of its population are superannuated female employees of the Government and there are a very large number of insane women. The hospital was used as a prison during the French Revolution.

SAL PRUNELLE. See SALTPETRE.

SALSETTE'. An island on the west coast of British India, situated immediately north of Bombay, with which it is connected by a causeway, and separated from the mainland by a channel less than a mile wide. The area is about 241 square miles. It is chiefly notable for a number of remarkable caves found at Kenery in the middle of the island. They are nearly a hundred in number, are all excavated in the face of a single hill, and contain elaborate carvings, especially representations of Buddha, many of them of colossal size.

SALSIFY (Fr. *salcifis*, dialectic *sercifi*, OF. *sercifi*, *cerchefi*, from It. *sassafrica*, goat's-beard, from Lat. *saxum*, rock + *fricare*, to rub), OYSTER PLANT, or VEGETABLE OYSTER (*Tragopogon porrifolius*). A biennial plant of the natural order Compositæ, indigenous to the Mediterranean region and cultivated in Europe, America, and Australia for its edible spindle-shaped root, 8 to 12 inches long and about an inch in diameter at the top. It requires a deep, rich soil, and is cultivated like parsnips, like which it may be left in the ground during the winter. In the second season it produces many-branched flower stalks three or four feet high bearing terminal heads of purplish flowers. A yellow-flowered variety of salsify (*Tragopogon pratensis*) is a weed both in Europe and America.

SALT (AS. *sealt*, Goth. *salt*, OHG. *salz*, Ger. *Salz*, salt; connected with Lat. *sal*, Gk. ἅλς, *hals*, OIr. *salann*, Lett. *sāls*, OChurch Slav. *soli*, salt). The chloride of sodium, known mineralogically as halite (q.v.), containing 60.41 per cent. of chlorine and 39.50 per cent. of sodium. The principal sources of salt are the ocean, salt lakes, subterranean brines, and deposits of rock salt. Since all river waters carry alkalies in solution, the accumulation of dissolved materials may become very great when the rivers enter a reservoir which has no other outlet than by evaporation. It is in this way that the brines of salt lakes have been formed, and the salt of the ocean probably has been derived also from the wash of the lands. The degree of concentration of such brines depends upon a number of factors, such as the volume of the reservoir, amount of water supplied, rate of evaporation, and the time during which the process has been carried on. In the Caspian Sea the dissolved salt amounts to only 0.63 per cent., while the Mediterranean contains 3.37 per cent., the Atlantic Ocean (average) 3.63 per cent., and the Dead Sea 22.30 per cent. When the water evaporated exceeds that entering the reservoir, the solution may become saturated, and the salts will then be deposited in the order of their solubility, such slowly soluble substances as gypsum being precipitated

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first, and salt, which is very soluble, being deposited last. The drying up of lakes or the evaporation of sea water in inclosed bays has thus led to the formation of rock salt deposits. These deposits are frequently interstratified with beds of shale, which it is supposed were laid down during periods of high water when the streams washed an unusual quantity of sediment into the lake or bay.

DISTRIBUTION AND PRODUCTION. The occurrence of salt is widespread both as regards its geographical and geological distribution. In the United States the most productive deposits are found in New York, Pennsylvania, Virginia, West Virginia, Ohio, Michigan, Illinois, Kansas, Louisiana, and Texas. Important quantities of salt are won also from the waters of Great Salt Lake in Utah and from those of San Francisco Bay in California. In New York the salt is obtained from beds of the Salina series, where it exists as lens-shaped deposits of rock salt which attain an extreme thickness of 250 feet. Since the beds outcrop in the central part of the State and dip southward, some of the more southern deposits lie at a depth of 2700 feet. The Salina formation also carries salt in Michigan at a depth of from 1600 to 2200 feet. The great source of salt in this State, however, as well as in Ohio, is the Lower Carboniferous, from which the brines sometimes have an added value owing to the presence of bromine. In West Virginia the salt occurs in the Lower Carboniferous along the Kanawha and Ohio rivers. Kansas has recently attained importance as a producer of both brine and rock salt, which is extracted from beds that lie along the contact of the Permian and Triassic systems at a depth of from 450 to 1000 feet. The extensive deposits occurring on Avery Island and the island of Petit Anse, La., are of recent geologic age.

The production of salt in the United States has increased very rapidly. The output in 1881 was 6,200,000 barrels (of 280 pounds), valued at $4,200,000; in 1891 it was 9,987,945 barrels, valued at $4,716,121; and in 1901 it amounted to 20,566,721 barrels, valued at $6,617,449. A considerable portion of the output in recent years has been converted into the various soda products. The production by States in 1901 was as follows:

PRODUCTION OF SALT IN THE UNITED STATES IN 1901

	Barrels	Value
New York	7,286,320	$2,089,834
Michigan	7,729,641	2,437,677
Kansas	2,087,791	614,365
Ohio	1,153,535	455,924
California	601,659	133,656
Utah	334,484	326,016
West Virginia	231,722	94,732
Other States	1,141,569	465,245
Total	20,566,721	$6,617,449

In Europe the most notable deposits of salt are found in the Cheshire district of England; at Stassfurt, Brunswick, and Hanover, Germany; Wieliczka, Bochnia, and Hallstadt, Austria; Máramaros, Hungary; the Crimea and the Donetz basin, Russia; and Cardona, Spain. The mines of Wieliczka, near Cracow, are famous for their great antiquity and the unusual size of the underground workings. France and Italy are extensive producers of salt from sea water.

The production of salt by the principal countries of the world in 1900 was as follows:

WORLD'S PRODUCTION OF SALT IN 1900

	Short tons
United States	2,921,708
United Kingdom	2,084,709
Canada	62,055
Germany	1,749,385
France	1,199,675
Austria-Hungary	572,642
Russia (1899)	1,852,861
Italy	404,715
Spain	495,965
India	1,125,611
Japan (1899)	650,834
Other countries	81,717
Total	12,201,877

EXTRACTION METHODS. The simplest method of obtaining salt is by the evaporation of sea water, but this is seldom practiced except in those countries which have no supplies of subterranean brines or rock salt. It consists in conducting sea water into shallow tanks or pools and then evaporating the water by the sun's heat. After the gypsum has crystallized out the concentrated brine is pumped into another vat where the salt evaporates. Subterranean brines are extracted by driving wells through which they are then pumped to the surface. Brine salt is also obtained from rock salt deposits by a process of solution. In this case a well is bored down to the salt stratum in the same manner as one bored for petroleum (q.v.). After the drilling has been completed, it is customary to case the well with a pipe. Inside of this there is put a second tubing, which usually extends to a lower depth than the outer pipe. The water is forced down between the outer and inner tubing, dissolves out the salt, and comes up through the inner tube. In some cases several wells are bored, the water being forced down one and the brine up the other. On reaching the surface it is discharged into settling tanks, in order to allow the suspended clay to settle. The brine is then pumped to the evaporating vats, which are either tanks with movable roofs, so that the salt can be evaporated by solar heat, or else are placed over furnaces, or hot pipes, and the water evaporated by artificial heat. The latter is the prevalent method.

In the solar process the brine is pumped into a series of tanks, in the first of which after standing for a while it becomes yellowish, due to the escape of carbonic acid gas and the precipitation of the iron. In the next series of tanks the gypsum separates, and these are known as the lime tanks. The brine remains here until the salt crystals begin to separate, indicating that the point of saturation is being approached. The brine or pickle is now drawn over into a third series of tanks, in which the salt forms on the bottom, and is removed by means of rakes several times during the season. The solar process is chiefly adapted to the manufacture of the coarser grades of salt. The finer grades, such as table salt, are produced by the use of artificial heat in the evaporation of the brine. This is carried on either in iron tanks or kettles. A tank is about 20 to 24 feet wide, 100 feet long, and 12 inches deep. The tanks rest on brick arches and the heat is supplied from grates set at one end of the tank and somewhat underneath it. Two pans are usually operated in connection with each other, known

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as the front and the back pan. The brine passes from the latter to the former, the supply being kept up to supply decrease due to evaporation. The grain of the salt is sometimes controlled by adding glue, soft soap, or other material during the process of evaporation. In the kettle process the brine is evaporated in kettles having a capacity of about 120 gallons. In the bottom of the kettle there is set a pan having a vertical handle. This is for the purpose of catching the gypsum and iron which separate first. When these substances have been precipitated the pan is carefully withdrawn.

In the mining of rock salt the deposits are worked by the usual shafts and chambers, and the product when brought to the surface is either shipped in large lumps or put through a breaker, which is a building containing a series of crushers, toothed rolls, and screens, for the purpose of breaking up the salt and separating it into the various sizes.

Salt has been and still is used to some extent as a fertilizer. It belongs to the class of soil amendments or improvers. (See MANURES.) Since it supplies no essential element of plant food, its value as a soil improver is probably due to its physical action (attraction for water, etc.), or to its ability to set free inert plant food in the soil. See COMPOSTS.

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SALT, Sir TITUS (1803-76). An English manufacturer, born at Morley, in the West Riding of Yorkshire. He learned the wool-stapling business, and in 1824 entered into partnership with his father at Bradford. He was the first to make practical use of Donskoi wool in worsted manufacture, and in 1836 he introduced alpaca to the British market. In 1853 he opened a great factory a few miles from Bradford, on the River Aire, about which there soon grew up the town of Saltaire. His factories were built with special regard to warmth, light, and ventilation, and in the town he erected hundreds of model dwellings, a public dining hall, factory schools, public baths, and other conveniences. He was created a baronet in 1869. Consult: Balgarnie, *Life of Sir Titus Salt;* and Holyrod, *Saltaire and Its Founder.*

SALTA, säl'tä. A northwestern province of Argentina, bordering on Bolivia and Chile (Map: Argentina, D 8). Area, 45,000 square miles. The western half is occupied by Andean ranges, while the eastern part belongs to the Gran Chaco. It is abundantly watered and contains a considerable area of agricultural land. Grain, sugar, and various kinds of fruit are raised successfully. The mountains contain gold, silver, copper, and other minerals, but the principal occupations of the inhabitants are agriculture and cattle-raising. Population, in 1900, 131,938. Capital, Salta.

SALTA. The capital of the Province of Salta, Argentina, situated among the mountains, 135 miles northwest of Tucumán (Map: Argentina, D 8). The town is well built with paved streets, and has a cathedral, a national college, and a normal school. A railroad runs to Buenos Ayres and an important trade is carried on with Bolivia. Population, in 1895, 16,672; in 1901 (estimated), 17,500.

SALT BUSH. See ATRIPLEX.

SALT-CAKE. A name applied to the crude sodium sulphate obtained when sodium chloride is treated with sulphuric acid. See SODA.

SALTILLO, säl-tēl'yō, or LEONA VICARIO. The capital of the State of Coahuila, Mexico, situated on the plateau 5200 feet above sea-level and 45 miles southwest of Monterey, on the Mexican National Railroad (Map: Mexico, H 5). It is regularly laid out, and has a handsome church, a college, an athenæum, and the Madero Institute, containing a library. The chief industries are the manufacture of blankets and shawls, cotton cloth, and flour. The town is an important trade centre. Population, in 1895, 26,801. Saltillo was founded in 1586 as an outpost against the Apaches. Near the city is Buena Vista, the scene of a battle between the Mexican and the United States forces in 1847.

SALTIRE. One of the ordinaries in heraldry (q.v.).

SALT LAKE CITY. The capital of Utah and the county seat of Salt Lake County, near the Jordan River and 12 miles southeast of Great Salt Lake; 676 miles west by north of Denver (Map: Utah, B 1). The Union Pacific, the Rio Grande Western, the Utah Central, and other railroads enter the city. Salt Lake City holds a unique place among the towns of the United States as the headquarters of the Latter Day Saints, generally known as Mormons (q.v.). It is situated in a spacious valley, more than 4300 feet above the sea, and surrounded by mountains. To the east is Fort Douglas (q.v.), a United States Government military post, with an extensive reservation. There are hot sulphur springs in the vicinity, and on the shores of Great Salt Lake (q.v.) are several bathing resorts, of which Saltair and Garfield Beach are the most popular. The city has an area of more than 51 square miles. It is laid out on a grand scale, the streets being broad and regular, and pleasantly shaded. Irrigation ditches line the thoroughfares. Lawns and gardens add to the general attractiveness. Many of the wards contain public squares. Liberty Park has an area of 110 acres.

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Near the centre of the city is the Temple Block (square), containing the Temple, the Tabernacle, and the Assembly Hall—all together forming the official seat of the Mormon Church. The Temple, the most beautiful of the imposing edifices erected by the Mormons, was begun in 1853 and was finished in 1893 at an estimated cost of $4,000,000. The structure is of granite, 186 by 99 feet, and each end is surmounted by three lofty towers. The highest spire supports a figure of the Mormon angel Moroni. The Tabernacle is an elliptical building, 250 by 150 feet, having a roof similar in shape to a turtle-shell. It is noted for one of the largest self-supporting arches in the world and for its great organ. Its acoustic properties are superb. The auditorium seats several thousand persons. Among other buildings connected with the Mormon Church are the former residences of Brigham Young, the Lion House, the Beehive House, and the Gardo House, the tithing storehouse, and also the large establishment of Zion's Co-operative Mercantile Institution, whose annual sales are said to amount to more than $4,000,000. A monument in honor of Brigham Young is one of the features of Salt Lake City. The city and county building, costing $900,000, is the most noteworthy of the public edifices. Other prominent structures are the Salt Lake Theatre, the Exposition Building, the State Penitentiary, and Holy Cross and Saint Mark's hospitals. The University of Utah (q.v.) is in Salt Lake City, also a State Normal School. The private institutions for secondary education include All Hallow's College (Roman Catholic), Gordon Academy (Congregational), the Latter Day Saints' College, Rowland Hall (Protestant Episcopal), and the Salt Lake Collegiate Institute (Presbyterian). There are several libraries, of which the most important, aside from those belonging to the educational institutions, are the Public, with some 14,000 volumes, and the State Law Library, with 10,000.

Salt Lake City is the most important town between Denver and the Pacific Coast. Its interests are mainly commercial, the city being the distributing centre for a vast and rich mining, stock-raising, and farming country. The productiveness of the region is secured by means of irrigation. The city is the headquarters of several large mining companies, and has smelters and mineral mills. Its industrial importance, however, is comparatively small, the various manufactories in the census year 1900 having had only $4,049,000 capital and an output valued at $6,109,000. Among the leading establishments are car shops, breweries, confectionery factories, boot and shoe factories, foundries and machine shops, lime and cement works, saddlery and harness factories, looking-glass and picture frame factories, tobacco, cigar, and cigarette factories, lumber mills, etc. Electric power is used by many of the factories, as well as by the electric lighting and the street railway plants. The power is electrically developed from a mountain cataract some 35 miles from the city.

The government is vested in a mayor, elected every two years, a unicameral council, and administrative officials, the majority of whom are appointed by the mayor with the consent of the council. The city attorney, treasurer, auditor, recorder, and justices of the peace, however, are chosen by popular vote. The city spends annually for maintenance and operation about $790,000, the principal items being: schools, $265,000; interest on debt, $168,000; streets, $60,000; fire department, $43,000; police department, $40,000; water-works, $37,000; municipal lighting, $31,000. The water-works, built in 1874, are the property of the municipality. The system has cost more than $4,400,000. It now comprises 150 miles of mains. The net debt of the city in 1902 was $3,505,866; the assessed valuation, $33,692,318. The population in 1860 was 8236; in 1870, 12,854; in 1880, 20,768; in 1890, 44,843; in 1900, 53,531.

The city was founded in 1847 by the Mormons under Brigham Young, who, leaving the Missouri River on April 7, arrived at this point on July 24. It was organized as a city in 1851, and until 1868 was called Great Salt Lake City. About one-third of the inhabitants now are 'Gentiles.' Consult: Bancroft, *History of Utah* (San Francisco, 1889); Jones, *Salt Lake City* (Salt Lake City, 1889); Powell (editor), *Historic Towns of the Western States* (New York, 1901). See MORMONS.

SALT-MARSH CATERPILLAR MOTH. A moth (*Leucarctica acræa*) found in New England and so named because its larva, a hairy caterpillar, feeds on the salt grass of the marshes. See Colored Plate of MOTHS.

SALTO, säl'tô. The capital of the department of the same name, Uruguay, on the left bank of the River Uruguay, 260 miles northwest of Montevideo, with which it has railway connection (Map: Uruguay, F 10). Here steamers from Montevideo and Buenos Ayres transship their cargoes for Southern Brazil, either by rail or river transportation. The chief industries are leather manufacturing, the salting of meats, and boat-building. Commercially Salto ranks second to Montevideo in the Republic. It was founded in 1817, and its present population is about 13,000.

SALT OF TARTAR. A commercial name for crude potassium carbonate.

SALTONSTALL, sal'ton-stal, GURDON (1666-1724). A colonial Governor of Connecticut, born at Haverhill, Mass. He graduated at Harvard in 1684, and in 1691 was ordained pastor of the First Church (Congregational), at New London, Conn. He soon became prominent in politics and was elected Governor of Connecticut in 1707, to fill the unexpired term of Governor Winthrop, and was thereafter reëlected until his death. It was largely due to him that Yale was removed from Saybrook to New Haven.

SALTPETRE (OF. *salpestre*, Fr. *salpêtre*, from Lat. *sal*, salt + *petra*, from Gk. πέτρα, rock), or NITRE. A mineral potassium nitrate crystallizing in the orthorhombic system. It is found native in certain soils of Spain, Egypt, and Persia, and especially in East India, although in relatively small quantities. Still smaller deposits, of local importance only, are found in various parts of the world. In the United States such deposits occur in caves in Kentucky and elsewhere in the Mississippi Valley, as well as in Tennessee. Saltpetre occurs but seldom in strata, being for the most part a product continually formed by the action of atmospheric air upon nitrogenous organic matter in the presence of bases. The process of refining consists in bringing the nitre into solution and adding potas-

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sium carbonate for the removal of any calcium or magnesium salts that may be present. Glue is then added to the solution, and thus, on boiling, a scum is formed on the surface containing any organic substances that may be present. When the scum ceases to rise the liquid is allowed to settle and the clear portion is run off into coolers, from which the nitre separates as minute floury crystals which are finally washed to remove all adhering mother liquor. Much of the commercial saltpetre is now made from 'Chile saltpetre' (see below) by means of potassium chloride. Potassium nitrate is readily soluble in water. When heated to about 340° C. (644° F.) it fuses without decomposition, forming a thin liquid, which, cast into molds, solidifies to a white, translucent, fibrous mass known as *sal prunelle*. It finds extensive use in the arts, as in the manufacture of gunpowder and other explosives, and a small proportion is employed in the making of fireworks and matches; also it serves as a preservative for foods, as a flux in assaying, as an ingredient of certain fire-extinguishers, and in medicine.

Chile saltpetre, or cubic nitre, is the mineral sodium nitrate that is found native along the western coast of South America, especially in Northern Chile and Bolivia, where it occurs in beds several feet in thickness. The commercial article is prepared by lixiviation of the crude material with boiling water, concentration, and crystallization. The resulting salt contains from 92 to 97 per cent. of pure sodium nitrate.

SALT RANGE, or KALABAGH. A mountain range of the Punjab, India, between the Indus and the Jhelum (Map: India, B 2). It is a rugged chain of rocky and barren peaks from 2000 to 5000 feet high, and is noted for immense deposits of pure rock salt.

SALTS. Compounds formed by the substitution of metals for the hydrogen of acids. See ACIDS; DISSOCIATION; CHEMISTRY (historical section).

SALTS, SMELLING. A preparation of carbonate of ammonia with some of the sweet-scented volatile oils, used as a restorative by persons suffering from faintness. The pungency of the ammonia is all that is useful, the oils being added to make it more agreeable. Oils of lavender, lemon, cloves, and bergamot are those chiefly used.

SALT SPRING. A common term for subterranean saline waters which reach the surface through natural or artificial passages. Aside from their unusually large content of dissolved minerals salt springs possess no distinctive features of interest. See SPRING and SALT.

SALTUS, sȧl'tŭs, EDGAR EVERTSON (1858—). An American novelist and journalist, born in New York City. He received his education in Saint Paul's School, Concord, N. H., and later in the Sorbonne and the Universities of Munich and Heidelberg. He graduated from the Columbia Law School in 1880. His first published works were biographical and philosophical: *Balzac* (1884); *The Philosophy of Disenchantment* (1885); and *The Anatomy of Negation* (1886). Later he wrote much fiction, dealing chiefly with contemporary fashionable life: *Mr. Incoul's Misadventure* (1887); *The Truth About Tristrem Varick* (1888); *Eden* (1888); *A Transaction in Hearts* (1889); *The Pace that Kills* (1889); *A Transient Guest* (1889); *Love and Lore* (1890); *Mary Magdalen* (1891); *A Story Without a Name* (1891); *Imperial Purple* (1892); *Madame Sapphira* (1893); *Enthralled* (1894); *When Dreams Come True* (1895). An elder brother, FRANCIS SALTUS SALTUS (1849-89), was a poet, traveler, and linguist, whose first volume, *Honey and Gall*, appeared in 1873. After his death his poems were edited in four volumes by his father.

SALTYKOFF, sȧl'tĭ-kŏf', MIKHAIL. A Russian writer. See SHTCHEDRIN.

SALTZMANN, zälts'mȧn, KARL (1847—). A German marine and landscape painter, born in Berlin. He was for three years a pupil of Herman Eschke, then studied at Düsseldorf, and after traveling through Holland and Italy, settled in Berlin. Some coast and harbor views in Holland, as well as delineations of the agitated sea, e.g. "Entrance to Harbor of Kolberg" (1878, collection of German Emperor), had already furnished proof of his remarkable talent, when the chance came to him of accompanying Prince Henry of Prussia on his trip around the world in 1878-80. Of several pictures resulting from that tour may be mentioned "Corvette Prince Adalbert in the Strait of Magellan" (1833, Breslau Museum), and "In the Pacific Ocean" (1888, German Emperor). In the suite of Emperor William II. he visited Saint Petersburg in 1888, Norway in 1889 and later, and from these and other journeys resulted such subjects as "William II. Whaling in Norway" (1892), "Surrender of Danish Ships at Eckernförde" (1894, Kiel Museum), "Opening of Kaiser-Wilhelm Canal" (1896), and "Sailing Vessel in Drift-Ice" (1898). The National Gallery in Berlin contains "Cruiser Leipzig at Saint Helena" (1893) and "Manœuvre of Torpedo-Boats." In 1888 Saltzmann was awarded the great gold medal at Berlin; in 1894 he became instructor, and in 1896 professor at the Academy.

SA'LUS. The Roman goddess of health, corresponding to the Greek Hygeia. She had a temple on the Quirinal Hill dating from B.C. 307. She is represented with a rudder and globe or pouring a libation on an altar encircled by a serpent.

SALUTATI, sä'lōō-tä'tē, or **SALUTATO**, COLUCCIO DE' (1330-1406). An Italian humanist. In 1375 he was appointed Chancellor of Florence, and in that capacity he exercised great influence throughout Italy. His State papers were written in elegant Latin. Among his writings were biographies of Boccaccio, Petrarch, and Dante, and a translation into Latin of part of the *Divina Commedia*. He also directed the publication of Petrarch's epic, *Africa*. Collections of his epistles appeared at Rome in 1741 and 1742. Consult Tiraboschi, *Storia della letteratura italiana*, vol. xii. (Florence, 1805-13).

SALUTATIONS (Lat. *salutatio*, from *salutare*, to salute, from *salus*, health, prosperity, from *salvus*, safe; connected with Skt. *sarva*, whole, entire). The employment of formal and prescribed methods of address when one person encounters another. Such greetings were formerly graduated according to rank; in recent times, with increasing democracy, they have grown less and less precise. Salutations may be made either by words or gestures. With respect to the verbal formulas they may be classified

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under several heads. (1) The expression of a desire for the prosperity of the person accosted. This depended originally on the belief that a wish for good or evil might be effective in bringing about the state of things desired and produce a corresponding effect on the individual toward whom it was directed. We have a simple example in the expression 'Your health!' used in drinking. (2) The offering of a prayer for the well-being of any one, which is continued in our 'good morning,' 'good night,' which are abbreviations for 'God give you good morning,' etc. (3) Expressions of gratitude, admiration, or honor. Here belongs the 'plural of majesty,' applied first to kings, and by degrees made general.

Terms of respect like 'your Honor,' 'your Majesty,' 'your Grace,' 'your Excellency,' have been appropriated to particular degrees of rank. It is only a more ancient variety of the preceding use when an idea of adoration is introduced of which a survival is seen in the title of 'Reverend' applied to clergymen. Gestures may be regarded as arising in the first place from the animal impulses, as in the pleasure of contact which induces patting the cheek or hand, embracing, and the like. The manifestation of such enjoyment exhibits much variation; thus kissing is by no means a universal human practice, but is rather confined to certain peoples. There are likewise attitudes of subservience, implying that the inferior puts himself at the disposal of the superior. Here belong our customs of bowing and courtesying, of lifting the hand in salute, and the kneeling and prostration still practiced in the Orient. Denudation is a movement symbolic of resignation of one's goods to a ruler, and survives perhaps in the customs of lifting the hat or removing the glove before shaking hands.

SALUTES. Military courtesies rendered by non-commissioned officers and men to commissioned officers, and among the latter by juniors to seniors in rank, also the compliments paid by the military or naval services of a nation to the ruler or representative of another nation. All army officers salute on meeting and in making or receiving official reports, the junior saluting first, except when the salute is introductory to making a report to the representative of a common superior, as the adjutant, officer of the day, etc., when the officer making the report salutes first. Enlisted men unarmed salute with the hand farthest from the officer. Officers are always saluted whether in uniform or not. Enlisted men unarmed, whether covered or uncovered, salute before addressing an officer, and again after receiving a reply. In the English army this detail differs to the extent that soldiers uncovered always salute by standing simply to attention. Soldiers in the United States Regular Army are required to salute, in the prescribed form, officers of the navy, marines, volunteers, and militia, just as they would their own officers. When the national or regimental color standard uncased is carried past a guard or other armed body the salute is given, and the field music sounds 'to the color.' Officers and men armed salute in the manner prescribed for such arm, or if unarmed, make the salute by uncovering. British regulations differ again here in that under no circumstances, save in church and during a part of the burial service, do officers or men uncover.

SALUTES WITH CANNON are fired between sunrise and sunset only, Sundays usually excepted, and the national flag is displayed. The national salute of 21 guns is accorded to the President on his arrival and departure from a military post or naval vessel, no other personal salute being allowed in his presence. The number of guns prescribed for other officials is as follows: The Vice-President, 19; Ambassador, 19; Secretary of War, Secretary of the Navy, or other Cabinet officer, Chief Justice, Governor-General, Governor of State or Territory, or island, President of the Senate, Speaker of the House of Representatives, committee of Congress, admiral, or general, 17; Assistant Secretary of the Navy, Envoy Extraordinary, vice-admiral, or lieutenant-general, 15; minister resident, rear-admiral, or major-general, 13; chargé d'affaires, commodore, or brigadier-general, 11; consul-general, 9; consul, 7; vice-consul, or commercial agent, 5.

In the navy salutes are of various kinds. A junior or inferior salutes a senior or superior by touching his cap. Other salutes are firing of guns, manning of yards, dipping of colors, etc. Men in boats salute by lying on their oars or tossing them. In the United States and in most other services 6-pounder guns are used for saluting when the ship has pieces of that calibre. When a man-of-war fires a salute to a foreign flag or a foreign officer the salute is returned gun for gun; but if the salute is to an officer of the same service the latter only returns the number of guns to which the junior is entitled by his rank. The salute by dipping of colors is made by a man-of-war only in answer to a similar salute made by a merchant vessel. As few modern men-of-war have yards, manning the yards is no longer a common usage.

SALUZZO, sä-lōō'tsô. A city in the Province of Cuneo, Italy, at the foot of the Alps, near the right bank of the Po, 18 miles by rail north-northwest of Cuneo (Map: Italy, B 3). It has a semi-Gothic cathedral, begun in 1480. The manufactures are silk fabrics, leather goods, iron ware, and hats. The chief trade is in grain, wine, and cattle. The Marquisate of Saluzzo, created in the first half of the twelfth century, lasted till 1548, when the city was seized by the French, who gave it up to Savoy in 1601. Population (commune), in 1901, 16,394.

SALVADOR, säl'vä-dōr'. The smallest and most densely populated republic of Central America, bounded on the north by Honduras, on the east by Honduras and the Gulf of Fonseca, on the south by the Pacific Coast, and on the northwest by Guatemala (Map: Central America, C 4). Its area is 8135 square miles.

TOPOGRAPHY. Along the northern border extends the great Sierra Madre of Central America, with many peaks ranging from 6000 to 8000 feet, culminating in that of Cacaguatique. Parallel with this and about 30 miles to the south extends a lower range, or rather elevated tableland, marked by clusters of volcanic peaks, of which Izalco (q.v.) is the most noted. There are deposits of gold, silver, copper, and lead in the eastern part of the Republic, iron in the western, and coal in the Lempa Valley. There are about 150 mines in operation. Between the main ranges is a tableland diversified by short mountain spurs and drained largely by the Lempa, the chief river of the Republic, and the San Miguel. This lofty valley constitutes its most fertile, most

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healthful, and most populous portion. Between the second range and the coast lies a series of plains broken by short rocky spurs that occasionally reach the shore. These plains are for the most part marshy and unhealthful during the rainy season. In addition to the rivers mentioned the La Paz and Goascorán are of interest in connection with the boundaries of Guatemala and of Honduras. The lakes are almost wholly of volcanic origin; Guija, belonging partly to Guatemala, and Ilopango are the most notable. The principal harbor, La Unión Bay, an arm of the Gulf of Fonseca, is the best in Central America. Earthquakes and volcanic eruptions are common. Hot and cold mineral springs are found in all parts of the country.

CLIMATE. The lower areas below 2000 feet, designated as 'hot lands,' are torrid and generally subject to fevers. Lying between 2000 and 5000 feet are the 'temperate lands,' enjoying an even and delightful climate. The rainfall is somewhat less than in adjacent States, but sufficient, the rainy season lasting from May to October.

For Flora and Fauna, see these titles under AMERICA. In general Salvador resembles the rest of Central America in its vegetable and animal life. Among its special flora may be mentioned the *hoitziloxitl*, whose product is known as 'Peruvian balsam;' the *pita*, whose fibre is used for thread, cordage, and cloth; and the *yucca*, utilized for the manufacture of starch. A moderate supply of cabinet and building timber exists, and many important medicinal and dye plants are annually exported. Native rubber trees abound, but wasteful methods are employed in extracting the product.

AGRICULTURE. The mountain valleys and tablelands are deeply covered by an alluvial soil which renders this section the richest agricultural region of Central America. By far the most important crop is coffee, which is grown everywhere in the Republic between the altitudes of 1500 and 4000 feet. The crop in 1901 amounted to 55,600,000 pounds. A fine quality of indigo, sugar for home consumption, tobacco, rice of the dry, upland variety, a little cacao, and the usual beans, corn, potatoes, vegetables, and fruits for local use, constitute the chief agricultural products. The cultivation of cotton is being encouraged by a Government export bounty. There is excellent pasturage, and during recent years many improvements have been made in the breeds of cattle.

MANUFACTURES. Aside from the simple household industries the manufactures of Salvador are not important. There are, however, sugar refineries and distilleries, whose products are largely for home consumption, saw mills, starch factories, cordage works, and mills for cleaning coffee.

TRANSPORTATION AND COMMUNICATION. A narrow-gauge railroad of some 60 miles connects the port of Acajutla with Sonsonate, Santa Ana, and San Salvador. Four steamship lines connect the ports of the Republic with those of the United States, Europe, and South America. Salvador has been a member of the postal union since 1879 and enjoys a fair local service.

COMMERCE. The exports for 1900 amounted to $9,132,958, of which amount coffee contributed $7,132,958; other exports in order of importance were indigo, balsam, silver coin and bullion, tobacco, and sugar. Owing to the absence of Atlantic ports, fruits are not largely exported. In 1901 515 vessels entered the various ports and the same number cleared; the value of dutiable imports was $6,537,876, and the exports of the same year, subject to duty, were $10,956,045. The chief imports were cottons, spirits, ironware, machinery, jewelry, drugs and perfumery, silks, woolens, earthenware and glass, and flour.

GOVERNMENT. Salvador has a centralized republican government under a constitution last revised in 1886. The executive power is vested in a President, elected by popular vote to serve four years, and assisted by a Cabinet of four Ministers. The legislative branch consists of a single House, composed of three members from each of the fourteen departments, elected annually. The judicial power is vested in a supreme court at the capital, and in five district courts, with local municipal justices. Each of the fourteen departments is in charge of the Governor, appointed by the national executive. The *alcaldes* and other municipal officers are elected by popular suffrage.

FINANCE. The Government receipts for 1901, largely from import and export duties and liquor excises, amounted to $6,556,722, and the expenditures for the same year to $7,640,891. The foreign debt in 1899, amounting to £726,420, was in that year assumed by the Salvador Railway Company; the internal debt in 1901 amounted to $8,325,905. There are four banks of issue, with a total note circulation of $1,673,854. The Government issues no notes, but in 1899 took control of the mint erected in 1892 by a private company. An attempt to introduce the gold standard in 1892 was unsuccessful, as was a later enactment in 1897. The Salvadorean peso varied in value from $0.46 in January, 1901, to $0.35 in April, 1903. The metric system was legally adopted in 1885, but the old Spanish measures are almost universally used.

DEFENSE. See under ARMIES. Salvador has one small cruiser.

POPULATION. The population of Salvador in 1901 was 1,006,848 (493,893 males and 512,955 females), an average of 139 to the square mile. Five per cent. of the population is reported as white, 55 per cent. as Indian, and 40 per cent. as of mixed blood. The capital is San Salvador (q.v.), a name often incorrectly applied to the Republic. The State religion is Roman Catholic, but other sects are tolerated. The elementary schools in 1893 numbered 585, with an average attendance of 29,427; above these are three institutes for secondary instruction, and in the capital there are a higher college for women, a polytechnic school, two normal schools, and a university, with faculties of pharmacy, jurisprudence, natural science, medicine and surgery, and civil engineering. There are public hospitals in eleven cities, asylums and training schools for orphans of both sexes, and the fine Rosales Hospital, costing $3,500,000, in San Salvador.

HISTORY. After the conquest of Central America by Alvarado in 1524-25 Salvador formed part of the Captaincy-General of Guatemala. When Mexico threw off the Spanish yoke in 1821 the Central American provinces accomplished the same result without bloodshed. For a time Salvador and her sister provinces formed a part of the ephemeral empire of Iturbide. After his overthrow and until 1839 it was one of the States of the Central American Federation, but since the dissolution

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of this, Salvador has usually opposed the successive attempts to unite Central America.

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SALVAGE (OF. *salvage*, from *salver*, *sauver*, Fr. *sauver*, to save, from Lat. *salvare*, to save, from *salvus*, safe). In maritime law, an allowance in money which is awarded by courts of admiralty to those who voluntarily save a ship or her cargo from loss by peril of the sea (when it may be called *civil salvage*), or recover them after capture (when it is termed *military salvage*). The service rendered in salving must be voluntary and not one which the person rendering it is under a legal duty to perform. The services of salvors must be rendered within the admiralty jurisdiction in order to entitle those rendering them to receive salvage, as the right to salvage is not recognized by the common law.

When the salvors are in possession they have a certain qualified property right in the ship, which does not, however, extinguish that of the owners, but gives them the right to continue the salvage service to the exclusion of other would-be salvors. Where the first set of salvors are themselves assisted by a second set, the salvage is divided according to the respective merits of the parties; but the law favors the first salvors, and only great peril of the first set or final abandonment of the vessel or cargo by them will justify interference on the part of a second.

The amount of the salvage to be paid is not fixed by any rule of law or statute, but rests within the discretion of the admiralty judge who awards the amounts due as salvage. The following considerations, however, are of great weight in determining what amount shall be paid as salvage: (1) The dangers from which the property is salved. (2) The danger to the salvors. (3) The value of the property salved. (4) The value of the property risked by the salvors. (5) The labor, time, and skill expended by the salvors. (6) The risk run by the salvors of not saving the property and consequently of not being remunerated for their labor.

Higher salvage will be usually decreed in derelict cases than where an intention of returning to the vessel temporarily abandoned is clear. While there is no absolute law regarding the distribution of salvage, the owners of the salvor vessel receive usually one-third, the master twice as much as the mate, the mate double a seaman's share, and those who navigate the saved ship into port, or otherwise take the greater risk, double the share of those who remain on the salvor vessel. A claim to salvage may be barred by a contract, not extortionate or unconscionable, to pay a fixed sum for the aid to be given. In such case the rights of the parties are determined by the contract and not by the maritime law of salvage, and the salvors may recover for services rendered whether they are successful or not. Another bar is the existence of a custom of rendering assistance among vessels of the same class, as in the steamboat navigation of the Mississippi. Salvage adjustments are made and enforced in England by the Court of Admiralty and in the United States by the United States District Courts. Salvors have a lien on the property salved, which takes precedence over all others and may be enforced in admiralty by a proceeding *in rem*, or the salvors may at their option proceed against the owner of the property salved by a proceeding *in personam*. See ADMIRALTY; LIEN; MARITIME LAW; DERELICT; PRIZE.

SALVANDY, säl'vän'dē', NARCISSE ACHILLE, Count de (1795-1856). A French statesman and historical writer, born in Condom (Gers). He took part in the campaigns of 1813 and 1814, and subsequently in the *Journal des Débats* attacked the reactionary policy of the Government. He was Minister of Public Instruction in 1837-39 and 1845-48, Ambassador to Madrid from 1841 to 1843, and to Turin from 1843 to 1845. In addition to his political and other fugitive writings, he published the novel *Don Alonzo, ou l'Espagne* (1824), *Histoire de Pologne avant et sous le roi Jean Sobiesky* (1827-29), *Seize mois, ou La révolution et les révolutionnaires* (1831), and other works.

SALVATIERRA, säl'vä-tē-är'rä. A Mexican town in the State of Guanajuato, on the River Lerma and on the Mexican National Railroad, 18 miles south of Celaya (Map: Mexico, J 7). Its most important manufactures are those of cotton goods. Its population, in 1895, was 11,008. The parish church, Nuestra Señora de las Luces, is one of the best in the bishopric. The town was founded in 1613 during the viceroyalty of the Count of Salvatierra, and two centuries later, April 16, 1813, was the scene of a bloody contest between the royal forces under Iturbide and the independents commanded by Ramón Rayon.

SALVATION ARMY, THE. A religious organization aiming to evangelize the masses who are outside of the influence of the churches. It was founded in England by William Booth (q.v.), who began open-air meetings in East London in 1865, independent of ecclesiastical connections, but himself still keeping in touch with church people, and finally established the 'East London Mission' in an old wool house in Bethnal Green. The name of 'Christian Mission' was assumed in 1869, and that of 'Salvation Army' in 1878. Military terms were substituted for the ecclesiastical designations which were first adopted. Uniforms were devised for the laborers, which were intended to be distinctive but plain and inconspicuous, and not to depart too noticeably from the usual costume. Hence they vary in different countries and are adapted to the national dress.

The doctrines of the Salvation Army are in harmony with those of the orthodox churches. No distinctions are recognized except those of individual ability and piety; and women serve in all duties on precisely the same plane as men. Conventionalities are thrown aside and all permissible devices are adopted and practices followed that will attract popular attention. The system of government and the nomenclature are absolutely military. The local districts and stations are provinces, districts, posts, etc.: the bodies of the working force are corps; the officers are the general, commandants, colonels, majors,

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captains, lieutenants, and sergeants. While funds are derived from subscriptions, the aim is to make the posts self-supporting. The general has been, from the first, the founder, William Booth, who was ably seconded by his wife, Catherine (Mumford) Booth, until her death in 1890. For her devotion to the work she has been called 'the mother of the Salvation Army.'

The Salvation Army has extended its field of operations until in 1903 it carried on campaigns in 49 countries and colonies of Europe, Asia, Africa, America, and Australasia. It reports 7174 corps, circles, and societies, with 15,590 officers and employees. The gospel is preached in 31 languages. The number of social institutions for the poor is 620, with daily accommodation for 33,000. The number of beds supplied in 12 months is given as 4,398,854, and the number of meals supplied in the same period as 7,641,775.

In 1880 George Scott Railton was sent over from England to organize the Salvation Army in the United States. What it has actually accomplished since that time, as well as its methods of work, are succinctly stated in the following table, taken from the *Pocket History* prepared by the Army:

Officers, cadets, and employees	3,048
Corps, outposts, slum posts, and social institutions	911
Accommodation in social institutions	9,000
Expended annually upon the poor of America, exclusive of farm colonies	$480,000
Annual provision of beds for the poor	3,000,000
Industrial homes, wood yards, and stores for unemployed	53
Accommodation (finding daily work for the unemployed)	650
Annual income from their work	$150,000
Outside employment found for about	25,000
Farm colonies	3
Acreage	2,800
Colonists (men, women, and children)	400
Rescue homes for fallen girls	21
Accommodation in same	500
Girls passing through yearly	1,800
Babies cared for in rescue homes daily, about	160
Passing through annually, about	500
Accommodation for children in orphanages	150
Accommodation for children in day nurseries	100
Children settled on colonies with parents, about	250
Children cared for in various ways, annually about	1,500
Christmas dinners, clothing, and toys, persons provided with	250,000

The Salvation Army issues 58 weekly and monthly periodicals in 24 languages. Among them may be mentioned *The War Cry* (weekly), *The Young Soldier* (weekly), *The Social Gazette* (weekly), and *All the World* (monthly). For the history of the Army and its work, consult the works of General Booth, particularly *In Darkest England and the Way Out* (London, 1890); the writings and memoirs of Mrs. Booth (see the biographical notice of her husband); the *Life of General Booth*, by his son-in-law, Commander Booth-Tucker (New York, 1890); Railton, *Twenty-one Years' Salvation Army* (London, 1887); id., *Heathen England* (ib., 1891).

SALVATOR. A name (compare 'monitor') given to various large lizards, as the teju (q.v.), in reference to the belief that they warn persons of the presence of a crocodile or alligator.

SALVATOR ROSA. See ROSA, SALVATOR.

SALVE. See OINTMENT.

SALVIA. See SAGE.

SAL'VIA'NUS. A Christian writer, of the fifth century. He was a native of Cologne, and during the latter part of his life was presbyter at Marseilles. He wrote several works on devotional subjects, of which there are extant *Adversus Avaritiam*, a treatise against avarice, which appeared in four books under the pseudonym of Timotheus (c.440 A.D.); *De Gubernatione Dei*, on the providence of God, a work in eight books, written during the inroads by the barbarians upon the Roman Empire; and nine pastoral letters. These works are valuable for their vivid descriptions of the life and morals of the period. The best editions are by Halm (Berlin, 1877) and by Pauly (Vienna, 1883).

SALVIATI, säl'vē-ä'tē. A name frequently applied to the Italian painter Francesco dei Rossi (q.v.).

SALVINI, säl-vē'nē, ALESSANDRO (1861-96). An American actor, son of the Italian tragedian Tommaso Salvini (q.v.). Born at Rome December 21, 1861, he was educated at Florence as a civil engineer. He came to America in 1881, and after learning English became an actor and played with Clara Morris and Margaret Mather. He joined his father's company when the latter came to this country in 1885. In New York City he won successes as Launcelot in *Elaine* and as Henry Borgfeldt in *The Partners*, but his best known plays throughout the country were perhaps *Monte Cristo*, *Hamlet*, and *The Three Guardsmen*. His D'Artagnan was an admirable performance. He died at his father's home in Florence, Italy, December 15, 1896. Consult McKay and Wingate, *Famous American Actors of To-day* (New York, 1896).

SALVINI, TOMMASO (1829—). A celebrated Italian tragedian, born at Milan. His parents were actors, and when a boy he showed such talent for the stage that he was placed under the tuition of the great Gustavo Modena. After winning renown in juvenile characters he joined the Ristori troupe. In 1849 he entered the army of Italian independence, in which his services were conspicuous. After the war he appeared in the *Edipo* of Niccolini and achieved a great success. Alfieri's *Saul*, in which he played not long afterwards, was perhaps the greatest of all his characters. In Paris, where he played Orosmane (in Voltaire's *Zaïre*), Orestes, Saul, and Othello, he was received with great enthusiasm. In 1865, at the sixth centenary of Dante's birthday in Florence, Salvini with the other great Italian actors, Rossi, Gattinelli, and Ristori, was invited to perform in Silvio Pellico's *Francesca da Rimini*. His first appearance in the United States was in 1873, and he was so well received that he repeatedly returned. During his second visit (1880-81) he first tried the experiment of acting in Italian with a company that spoke English. In 1886 he and Edwin Booth played together for three weeks, Salvini as Othello and Booth as Iago. After Salvini's last tour in this country in 1890 he retired from the stage to his home in Florence. Consult: *Leaves from the Autobiography of Tommaso Salvini* (New York, 1893); *Ricordi, aneddoti ed impressioni* (Milan, 1895); Winter, *Shadows of the Stage* (New York, 1892).

SALWIN, säl'wēn', or **SALWEEN.** A large river of Southeastern Asia. It rises in the southeastern part of Tibet and flows southward through the Province of Yun-nan, China, and then through Burma, emptying into the Gulf of Martaban, east

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of the delta of the Irrawaddy (Map: Asia, J 5). It is over 1500 miles long. Almost the entire course of the river is through a narrow valley with steep sides; its flow is often extremely swift, and it is frequently interrupted by rapids caused by rocky reefs extending across the channel. Its basin is narrow, and the tributaries are nearly all very short, some of them entering the main stream by cataracts. Consequently the river is of little importance for commerce. In Lower Burma, however, it is regularly navigated in stretches by steam launches.

SALYANY, sȧl-yä'nê. A town in the Russian Government of Baku, Transcaucasia, situated on the Kur (Map: Russia, G 7). It is the centre of the fisheries of the Kur. Population, in 1897, 12,120, chiefly Tatars.

SALZBURG, zȧlts'bōōrk. A duchy and crownland of Austria, bounded by Upper Austria on the north, Tyrol and Bavaria on the west, Tyrol and Carinthia on the south, and Styria and Upper Austria on the east (Map: Austria, C 3). Area, 2767 square miles. Salzburg is one of the most mountainous regions of Austria. The Hohe Tauern, which rise on its southern frontier, branch off into numerous high spurs running northward and are separated from one another by deep valleys. The northern part is covered by a continuation of the Salzburg Alps and contains a number of isolated mountains, some of them exceeding 9000 feet in altitude. The chief river is the Salzach, a tributary of the Inn, which drains almost the entire area of the region. There are a large number of mountain lakes, some of them situated at a very high altitude and of remarkable picturesqueness. The mountainous surface of Salzburg makes it unfavorable for agriculture, and the proportion of arable land is very limited. The cultivation of cereals is of minor importance and the crops do not suffice for the domestic demand. Cattle-raising receives considerable attention. Salzburg is rich in minerals and especially in salt, of which it supplies over 8 per cent. of the total output of Austria. Iron, gold, and copper are also mined to some extent. The manufacturing industries are limited and consist chiefly of glass, iron, and marble works. The house industries are confined to the manufacturing of coarse cloth, stockings, and linen. There is a State tobacco factory, employing over 400 men. Salzburg has a local Diet of 26 members and sends 6 representatives to the Austrian Reichsrat. The population in 1900 was 193,247, principally German Catholics. Capital, Salzburg (q.v.).

The town of Salzburg, built on the site of the Roman Juvavum, was made the seat of a bishopric in 696. In 798 the see was erected into an archbishopric. It gradually came into possession of an extensive district, and the archbishops of Salzburg occupied a prominent position among the ecclesiastical princes of the Holy Roman Empire. The archbishops expelled the Jews in 1498 and some 30,000 Protestant subjects in 1731-32. In 1802 the see was secularized and Salzburg became a temporal principality under Ferdinand, the dispossessed Grand Duke of Tuscany. In 1805 it passed to Austria, and in 1810 to Bavaria, and in 1814 was permanently united with Austria.

SALZBURG. The capital of the Crownland of Salzburg, Austria, charmingly situated amid mountainous scenery on the Salzach, 73 miles east-southeast of Munich (Map: Austria, C 3). The old town on the left bank of the river, with its narrow streets, flat-roofed houses, but beautiful squares and fountains, is dominated by the Hohen-Salzburg citadel, on the Mönchsberg, at an altitude of about 400 feet (1780 feet above sea level), reached by a cable railway. Four iron bridges connect the old with the modern section of the town. A bronze statue of Mozart, who was born here, adorns one of the spacious squares. The site of the ancient fortifications is now occupied by a handsome residential quarter. Among the interesting churches are the seventeenth-century late Renaissance cathedral, the twelfth-century Romanesque Saint Peter's, and the thirteenth-century Franciscan Church with an imposing Gothic tower. In the Benedictine Abbey of Saint Peter there is a library of over 40,000 volumes. The secular edifices include the Grand Ducal Palace, the Government buildings the former university buildings, and the Mirabell-Schloss, an ancient archiepiscopal palace, with a valuable geological collection. Of special interest are the ancient burial ground of Saint Peter and the Summer Riding School, with galleries hewn out of the solid rock. Among the educational institutions are the Museum Carolino-Augusteum, containing a valuable collection of antiquities and a library of over 50,000 volumes; a theological faculty, two upper gymnasia, a normal school, a priests' seminary, and a public library of over 65,000 volumes. Interesting features in the vicinity in addition to the fortress of Hohen-Salzburg, already alluded to, are the Capuzinerberg, with the Capuchin monastery, the Gaisberg, all commanding magnificent views, and the castle Hellbrunn, with gardens, theatre, etc. Population, in 1900, 32,934. For history, see SALZBURG above. Consult: Zillner, *Geschichte der Stadt Salzburg* (Salzburg, 1885-90); Bühler, *Salzburg und seine Fürsten* (Reichenhall, 1895).

SALZBURG FESTIVAL. An Austrian musical festival held annually at Salzburg, where the works of Haydn and other classic composers are rendered with scrupulous exactness. It ranks among the representative festivals of the world. See MUSICAL FESTIVAL.

SALZKAMMERGUT, zȧlts'kȧm'mĕr-gōōt. An alpine district covering the extreme southern portion of the Austrian Crownland of Upper Austria, together with parts of Styria and Salzburg. It is celebrated for its varied and picturesque scenery, embracing a series of beautiful lakes bordered by lofty, steep, and forest-covered mountains. The most noted of the lakes is the Traun, an expansion of the River Traun, which flows through the district. The principal resorts are Ischl and Gmunden. The Salzkammergut, as its name implies, is famous also for its immense salt deposits.

SALZMANN, zȧlts'mȧn, CHRISTIAN GOTTHILF (1744-1811). A German educator, born in Sömmerda, Thuringia, and educated for the Church at Jena. He was pastor at Rohrborn (1768-72) and then deacon at Erfurt, where he first proclaimed his belief in natural religion and his theory of isolation as a factor in moral education. In 1781 he was called to the Philanthropinum in Dessau to be teacher of morals and religion. Three years afterwards he started at Schnepfenthal a school which celebrated its cen-

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tenary in 1884. His more important books are the ironical *Krebsbüchlein* (1780), with directions for wrong education; *Karl von Karlsberg* (1783-88) and *Konrad-Kiefer* (1794), pedagogical fiction comparable to Pestalozzi's *Leonard and Gertrude;* and a *vade mecum* for the teacher, the *Ameisenbüchlein* (1806), showing the obverse of the *Krebsbüchlein.* Consult the memoir published by the school (Leipzig, 1884).

SALZWEDEL, zälts'vā'del. A town of the Province of Saxony, Prussia, 110 miles southeast of Bremen, on the navigable Jeetze, a tributary of the Elbe (Map: Prussia, D 2). It has some edifices interesting for their architecture and a valuable museum of prehistoric relics. The manufacture of pins, machinery, leather, and chemicals, and the weaving of damask and linen are the principal industries. Population, in 1900, 10,189. Salzwedel (1070-1170) was the capital of Altmark, the nucleus of the Prussian State.

SAMAIN, sȧ'măn', Albert Victor (1858-1900). A French poet, born at Lille. He studied at the Lycée and became an employee in the Prefecture of the Seine, a position which he held until his death. His first poems appeared in the *Mercure de France.* These were collected in 1893 as *Le jardin de l'infante,* to which was afterwards added *L'urne penchée* (1897). His other published volumes include *Aux flancs du vase* (1898), *Le chariot d'or,* and the lyric drama *Polyphème* (1901). His melancholy, refined verse is noted for its melody.

SAMALE, sȧ-mä'lȧ. A Malay people on Samal Island, Davao Bay, Southern Mindanao. See Philippine Islands.

SAMANÁ, sä'mȧ-nä', or Santa Barbara de Samaná. A seaport of Santo Domingo, situated on the north shore of the large Bay of Samaná, 64 miles northeast of Santo Domingo. It is the outlet for the fertile Vega Real, and exports cocoanuts, bananas, and cacao. Population, 5000.

SAMANG, sȧ-mäng'. A tribal group in the Malacca Peninsula. See Semang.

SAMANI, sȧ-mä'nē, and **DILEMI,** dĭ'lȧ-mē. Two Persian dynasties of minor importance. The Samani, who traced their descent to the Sassanidæ (q.v.), destroyed the Saffarids in A.D. 900, when Amr, the sixth Saffarid monarch, was conquered by Ismail ibn Ahmad, the third ruler of the Samanid line, who established the real power of his house. Ismail extended his sway over Transoxania, Balkh, Herat, Seistan, Khorasan, Gurgan, Tabaristan, and Rai, but the Caspian provinces were lost in the reign of his son and successor, Ahmad II., who died in 913. There were eleven monarchs of this dynasty: Ahmad I. (c.813-864); Nasr. I. (874-892); Ismail (848-907); Ahmad II. (died 913); Nasr II. (died 942); Nuh I. (died 954); Abd-al-Malik I. (died 961); Mansur I. (died 976); Nuh II. (captured 997); Mansur II. (blinded 999); and Abd-al-Malik II. (dethroned 999). After the death of Abd-al-Malik his brother, Ismail-al-Muntasir, maintained a resistance against the Alid dynasty, the conquerors of the Samanids, until 1004, when he fell a victim to treachery. The history of Persia during the century of Samani power offers few events of importance. The dynasty was a peaceful one, encouraging literature rather than conquest. Among the noteworthy names in Persian literature who flourished during this period were Rudagi (q.v.), Daqiqi (q.v.), and Firdausi (q.v.), who began his great epic, the *Shāh-nāmah,* at the Samanid Court.

The Dilemi, who came from the Province of Dilem, on the Caspian Sea, and ruled the Province of Gurgan, were founded by Mardawi (928-935), who was murdered in a mutiny at Ispahan. The line had eight other rulers: Vashmgir (935-967), the younger brother of Mardawi, three times driven from his throne, which he thrice regained by the help of his ally, the Samanid Nuh I.; Bistun (976); Kabus (976-1012), opposed by his son and successor, Minochir; Minochir (1012-29); Anushirvan (1029-43); Dara or Iskander (1043-c.1060); Kai Kaus, who wrote his *Qābūsnāmah* in 1080 or 1082 for the guidance of his son and successor, Gilanshah; and Gilanshah (1082-c.1090), who was captured by the Seljuk Sultan Malikshah. (See Seljuks.) Consult: Mirchond, *Histoire des Samanides,* translated by Defrémery (Paris, 1845); Justi, *Iranisches Namenbuch* (Marburg, 1895); Horn, "Geschichte Irans in islamitischer Zeit," in Geiger and Kuhn, *Grundriss der iranischen Philologie,* vol. ii. (Strassburg, 1900).

SÁMAR, sä'mȧr. One of the Philippine Islands, the easternmost of the Visàyan group. It is situated between latitudes 10° 42′ and 12° 43′ N. and between longitudes 124° 12′ and 125° 49′ E., and is bounded on the north, east, and south by the Pacific Ocean, and on the west by the Visayan Sea (Map: Philippine Islands, K 8). On the northwest it is separated from the southeastern extremity of Luzon by the Strait of San Bernardino, 11 miles wide, and on the southwest the Strait of San Juanico, one mile wide, separates Sámar from Leyte. It is roughly oval in shape, narrowing into a long, pointed peninsula in the southeast, and has an extreme length from northwest to southeast of 156 miles, with an average breadth of 50 miles. Its area is 5488 square miles, including about 150 small dependent islands covering 290 square miles. It ranks third in size among the islands of the archipelago.

The coasts of Sámar are more finely indented than those of any other island in the archipelago. The eastern coast, which is not very well known, is especially cut up into numerous small inlets and headlands, and is fringed with islets and rocks. Nearly the whole surface of the island is rough and hilly, though nowhere exceeding 2000 feet in altitude. The mountain region of the interior forms a forest-covered and little exposed wilderness.

The mineral wealth of Sámar has not been well explored and is not yet being exploited, partly owing to the hostility of the natives in the interior. Coal, gold, copper, and cinnabar are, however, reported in quantities of commercial value. The climate and soil of the island are well suited to the production of all the staple crops of the archipelago, and the output of hemp is very large, the normal amount annually exported previous to the insurrection of 1896 being 28,000,000 pounds. In 1899 the export of hemp amounted to 21,000,000 pounds. Sugar, rice, and cocoanuts are also raised in large quantities, while coffee, cacao, tobacco, and cereals are among the minor products. Mechanical industries are still undeveloped, though sugar and cocoanut oil are manufactured to some extent.

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There are practically no roads in the island, and means of communication are confined wholly to the waterways along the coasts and the rivers, most of the latter being navigable for native boats. All the towns and nearly all villages are situated on navigable water, and there is a considerable coasting trade. The inhabitants, whose number was estimated in 1901 at 195,386, are almost of pure Visayan stock, and speak the Visayan language. The island with its dependent islets forms a single province, whose capital is Catbalogan (q.v.).

Sâmar was one of the last of the Visayan islands to remain in active insurrection against the United States, and its pacification presented considerable difficulties, as the natives burned their villages and took refuge in the pathless wilderness of the interior. Not till the beginning of 1902 did sufficient American forces arrive to begin active operations in the field, and on February 18th Lukban, the chief leader of the Visayan insurgents, was captured. His successor, Gueverra, surrendered with all his followers to General Smith in April, and in June, 1902, civil government was inaugurated in the island. Consult the authorities referred to under PHILIPPINE ISLANDS.

SAMARA, sä-mä'rä. A government of Eastern Russia (Map: Russia, H 4). Area, over 60,300 square miles. The region is divided by the Samara, a tributary of the Volga, into two parts, of which the northern is largely hilly and abundantly watered, while the southern has the character of a steppe with a slight elevation in the southeast. The principal river of Samara is the Volga, which forms its western boundary for a distance of over 600 miles. Samara has a fertile black soil, exhausted somewhat by wasteful methods.

Agriculture is the principal occupation, and a considerable proportion of the product is exported. There are over 10,000,000 acres under cultivation, chiefly under wheat, rye, oats, and potatoes. The German colonists cultivate tobacco on an extensive scale. Famines are not infrequent. The annual value of the manufactures is only about $5,000,000. The population in 1897 was 2,763,478, of whom the Russians formed about 70 per cent.

SAMARA. The capital of the government of the same name in Eastern Russia, situated at the junction of the Samara with the Volga, about 740 miles southeast of Moscow (Map: Russia, H 4). It has an excellent port and immense grain storehouses. The chief industry is milling. There are a seminary for teachers, a seminary for priests, and a public library with a museum of antiquities. The trade in grain, flour, tallow, hides, wool, and horses is very extensive. Samara was founded as a fort in 1586. Population, in 1897, 91,672.

SAMARANG, sä'mä-räng'. The capital of the residency of the same name in Java, situated on the northern coast, at the mouth of the river of Samarang, and about 250 miles east-southeast of Batavia (Map: East India Islands, D 6). It is an important commercial centre, although its harbor is very defective and practically inaccessible during the monsoon. Population, in 1897, 84,244, including 3355 Europeans.

SAMA'RIA. The central division of ancient Palestine (q.v.).

SAMARIA (Heb. *Shōmĕrōn*, probably watch or guard, Aramaic *Shamrayin*, Gk. *Σαμάρεια*, *Samareia*, *Σεμερών*, *Semerōn*, *Σομορών*, *Somorōn*, *Σεμαρεών*, *Semareōn*, Lat. *Samaria*). A city of ancient Palestine (Map: Palestine, C 3), which, early in the ninth century B.C., was made by Omri the capital of the kingdom of Israel. According to I. Kings xvi. 23-24, after reigning six years at Tirzah, Omri bought the site from one Shemer, and named the city which he built there after the original owner. It was situated on a hill of more than 300 feet elevation, isolated on all sides except the east. It was about six miles northwest of Shechem and commanded the road northward to the plain of Esdraelon and westward to the coast. It was thus well adapted for a fortified capital. Under Ahab the city became a centre of Baal worship. The Syrians laid siege to it during the reign of Ahab (I. Kings xx. 1), and again in the time of Joram (II. Kings vi. 24 et seq.), but did not capture it. It was invested by Shalmaneser, King of Assyria, and, after a siege of three years, was taken by his successor, Sargon, in B.C. 722. (See SAMARITANS.) Samaria was captured by Alexander the Great (B.C. 331), who killed many of the inhabitants and replaced them with Macedonian colonists. It was taken and completely destroyed by John Hyrcanus (B.C. 120), but was soon rebuilt and remained in the possession of the Jews till Pompey restored it to the descendants of the expelled Samaritans. It was fortified by Gabinius. Augustus gave the town to Herod the Great, who rebuilt it with much splendor and called it Sebaste, after the Emperor (*Σεβαστή*, from *Σεβαστός* = Augustus). Philip the Evangelist preached Christianity in Samaria (Acts viii. 5), and in the third century it was an episcopal see. A Greek bishop still derives his title from Sebaste. After the Mohammedan conquest of Palestine the importance of Sebaste declined. It is now a small village (Sebastiyeh), with but few relics of its former greatness.

SAMARITAN LANGUAGE AND LITERATURE. The Samaritan belongs to the Semitic languages and may be grouped with the western Aramaic dialects, although it contains strong admixtures of Hebrew. It is no longer spoken, but is still studied by a few priests in the small Samaritan community (see SAMARITANS) at Nabulus, where the common speech is now Arabic. The dialect is interesting from a philological point of view, both because of its antiquity and of its 'mixed' character. Its history may be traced back to the fourth century B.C., but its beginnings belong to a still earlier date. That it survived the Arabic conquest is due to the sacred character which it acquired in the eyes of the Samaritans by virtue of the translation of the Pentateuch into their dialect. The alphabet is a direct derivation of the Phœnician and more antique in character than the ordinary Hebrew letters. Its phonology presents some peculiar characteristics, the most pronounced being the practical loss of guttural sounds, which leads to considerable confusion in the writing of words containing guttural letters. Its morphology presents no unique features, while its vocabulary contains many foreign words borrowed from Arabic, Latin, and Greek. The literature is of small extent and of little value. Besides the Samaritan Pentateuch and Targum (see SAMARI-

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TAN PENTATEUCH), it consists of chronicles, liturgies, and hymns. The chronicles include: (1) The *Samaritan Book of Joshua*, an Arabic chronicle, ascribed by critics to the thirteenth century, taken in part from the canonical Book of Joshua, with legendary additions, that charge the Jews with being oppressors of the Samaritans, and, after the time of Eli, apostates from the faith. The narrative is continued to A.D. 350, when it abruptly ends. (2) The Chronicle of the Generations, professedly written by Eleazer ben Amram, 1142, and afterwards continued by many hands; it gives a calculation of sacred times, the age of patriarchs, and a list of high priests. (3) The Chronicle of Abulfath, written about the middle of the fourteenth century, is drawn from the two previous works, with additional legendary matter. The liturgies and hymns belong to different periods. The Samaritans have also produced a number of commentaries, theological tracts, and grammatical works, written in Arabic. Consult: Petermann, *Brevis Linguæ Samaritanæ Grammatica* (Berlin, 1873); Kohn, *Zur Sprache, Litteratur und Dogmatik der Samaritaner* (Leipzig, 1876); id., *Samaritanische Studien* (Breslau, 1868); Nutt, *Fragments of a Samaritan Pentateuch* (London, 1874).

SAMARITAN PENTATEUCH. A recension of the commonly received Hebrew text of the Pentateuch, used by the Samaritans, and their only canonical book of the Old Testament. None of the manuscripts that have reached Europe is older than the tenth century. The variants which it presents from the Masoretic text are mostly of a trifling nature, representing chiefly different fashions of spelling. There are, however, more important differences, such as the occurrence of Gerizim. (See EBAL AND GERIZIM.) In the figures of Genesis v. and xi. are likewise discrepancies between the Masoretic and the Samaritan recension, which appear to be due to varying traditions. There is also one essential alteration respecting the Pentateuchal ordinances, Exodus xiii. 6, where the Samaritan Pentateuch has "six days shalt thou eat unleavened bread," instead of "seven." The Samaritan Pentateuch was printed in the Paris and London polyglots, and an edition in square Hebrew characters was published by Blayney (Oxford, 1790), but a critical edition is still a desideratum. In the absence of such an edition it is difficult to do more than to speculate on the age and origin of the work, but there is no reason to suppose that it is earlier than the fourth century B.C., and it may even belong to the third. The translation of the Samaritan Pentateuch into the Samaritan idiom above referred to (the Samaritan Targum) is ascribed by the Samaritans to their high priest Nathaniel, who died twenty years before Christ, but it can hardly be older than the fourth century A.D. It follows the Hebrew original very closely. A critical edition of it was published by Petermann and Vollers (Berlin, 1872-91). Consult: Gesenius, *De Pentateuchi Samaritani Origine, Indole, et Auctoritate* (Halle, 1815); Nutt, *Fragments of a Samaritan Pentateuch* (London, 1874).

SAMARITANS. A term used to designate the inhabitants of the Province of Samaria after the Assyrian conquest, and in later times the members of a religious community having its centre in Shechem (Nabulus) and the neighboring Mount Gerizim. The territory of Samaria became for the first time a distinct political organization after Gilead and Galilee had been captured by the Assyrians in B.C. 734. In B.C. 722 the independence of this State was lost. The city of Samaria was probably taken by Shalmaneser IV., but Sargon claims the victory and undoubtedly carried away a part of the population, according to his own account 27,290 persons. The bulk of the Israelitish population remained in the land subject to the same tribute as before (*Display Inscription*, 24). In B.C. 720 Samaria united with Hamath, Arpad, Simyra, and Damascus in an unsuccessful rebellion. A number of Arabian tribes such as the Tamudi, Ibadidi, Marsamani, and Hayapa were settled in the district of Samaria by Sargon in B.C. 715. According to II. Kings xvii. 24, the King of Assyria brought men from Babylon and from Cuthah and from Ava and from Hamath and Sepharvaim, and placed them in the cities of Samaria. It is probable that this King of Assyria was Asshurbanipal (B.C. 668-626). This is undoubtedly the King meant by "the great and noble Asnapper," who, according to Ezra iv. 9-10, brought a number of Elamitish and Babylonian peoples into the Province of Abar Nahara, or Trans-Euphratene. Such deportations would be natural after the conquest of Elam in B.C. 645, and the quelling of Shamash-shum-ukin's insurrection in Babylon, Cutha, and Sippara in B.C. 648. The statement in Ezra iv. 2 that the people of the land had been brought up by Esarhaddon is from the hand of the chronicler and deemed by some scholars unhistorical. The inhabitants of the Province of Samaria in the Chaldean and Persian periods were consequently made up of the descendants of the Israelites, who had never been deported, and of the Arabs, Babylonians, and Elamites settled there by Sargon and Asshurbanipal. The Israelites naturally continued the worship of Yahweh and retained the local traditions and the household gods honored by their fathers. The others added the worship of 'the god of the land' to their veneration of the gods of their fathers. But the gradual assimilation of the foreigners to the native stock involved the ascendency of the Yahweh cult.

It has been supposed, on the ground of the chronicler's statement in Ezra iv. 1-5, that the Samaritans desired to participate in the building of the temple in Jerusalem, but were refused permission to do so, and therefore conceived a hatred of the Jews. There is no mention, however, of the Samaritans, and the historical narrative is subject to grave doubts. In order to show that the completion of the temple was prevented by enemies until the second year of Darius, the chronicler refers to a letter sent to Xerxes and another sent to Artaxerxes by Tabeel, neither of which is given, but produces *in extenso* the text of letters written by Rehum and Shimshai to Artaxerxes, by Tatnai and Shetharboznai to Darius, by Cyrus, and by Darius. These letters, found in Ezra iii.-vi., are written in Aramaic. There is no indication in them which of the several kings who bore the names Xerxes, Artaxerxes, and Darius is intended, and even the most plausible construction leaves the impression that these documents should be considered in the same light as the numerous spurious decrees and official documents in Daniel, Esther, Maccabees, Aristeas, and Josephus. The

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most valuable historical work in Hebrew from the Persian period is the Memoirs of Nehemiah. It has been supposed that Sanballat, Tobiah, and Geshem, the enemies of the Judean governor, were Samaritans. The text rather suggests that Sanballat, the Horonite, was a Moabite from Horonaim, that Tobiah was an Ammonite and Geshem was an Arab. (See SANBALLAT.) Only a single phrase in Nehemiah iv. 2, by which "his brothers" is explained by the addition, "that is, the army of Samaria" (according to the Greek version), can be urged in favor of the former view, and this phrase is probably a late gloss.

According to Josephus (*Ant.* xi., 7, 2; 8, 2 sqq.), Sanballat, a Cuthean, was sent to Samaria as satrap by Darius III. (B.C. 336-330), and was permitted by Alexander to build a temple on Mount Gerizim, where he made Manasseh, his son-in-law, high priest. This Manasseh is evidently identical with the unnamed son of Joiada in Nehemiah xiii. 28, who was the son-in-law of Sanballat and was driven away by Nehemiah. His cousin, Jaddua, the son of Johanan, Joiada's brother, was high priest in the time of Darius III. (Neh. xii. 22) and Alexander (Josephus, l.c.). There is no reason to doubt the concurrent testimony of the Chronicler and Josephus as to the high priest in the days of Darius III. and Alexander. But it is necessary, if this be accepted, to assume that Nehemiah and Sanballat began their enmity in the reign of Artaxerxes II. (B.C. 404-359) and that Sanballat in his old age was Satrap of Samaria. The temple on Mount Gerizim was therefore, in all probability, built in B.C. 332, though no doubt there existed long before this time a shrine upon this mountain. How much of the older Israelitish literature was preserved in Samaria in the Persian period is not known, nor to what extent the Yahweh-worshiping communities there kept in touch with their kinsmen in Judea. Their deep interest in the Mosaic period and the religious associations of their own sacred places would naturally render them anxious to possess every document known to them as claiming Mosaic authorship. An evidence of such a desire to know and to practice what Moses taught is the fact that the Pentateuch, probably in the form given to it by the editorial activity of Ezra (see HEXATEUCH), was accepted by the Samaritans. The consciousness of worshiping Yahweh in the place where he had commanded that an altar should be built and benedictions pronounced (see EBAL AND GERIZIM) must have given a strong impetus to the Samaritan movement. It is not likely, however, that the centralization of the cult could be carried out everywhere in the province. The city of Samaria seems to have been hellenized at an early date, and the same is true of Scythopolis. Nor is it probable that those who lived in the Egyptian town of Samaria mentioned in papyri from the reign of Ptolemy II. (B.C. 285-247) were adherents of the Shechemite faith. Jews and Samaritans may indeed have disputed about the legitimate place of a Yahweh sanctuary in the time of Ptolemy VII. Philometor (B.C. 181-145), though it is not likely that this discussion was held before the King and that the deported Samaritans were put to death. It is generally recognized that no credence can be given to the alleged request of the Samaritans to Antiochus IV. (B.C. 175-164) for permission to dedicate their temple to Zeus Xenios (*Ant.*, xii. 5). II. Maccabees vi. 2 knows of no such request. While the Samaritans did not take a part in the Maccabean revolt, they profited from it at first, as the Seleucid rulers abandoned their policy of suppressing the native cults. The worship of Yahweh on Mount Gerizim could consequently be resumed. But the expansion of the Jewish power proved disastrous to the Samaritans. Jonathan secured possession of three districts, Ephraim, Lydda, and Ramathaim (I. Macc. xi. 34); and John Hyrcanus destroyed the temple on Mount Gerizim. In B.C. 107 the entire Province of Samaria became Jewish territory, after the fall of the city. Though the temple on Gerizim was not rebuilt, it is probable that a smaller shrine existed there even during the Asmonean period. Pompey, in B.C. 63, restored Samaria and Scythopolis as free cities, and Gabinius (B.C. 57-55) rebuilt Samaria and permitted Samaritans to dwell in the city. It was rebuilt on a still grander scale by Herod (B.C. 37-4) and given the name Sebaste in B.C. 27.

Even the city of Shechem was not uninfluenced by foreign thought. An evidence of this is the rise of sects, such as the Essenes, Sabuæans, Gorthenes, and Dositheans. The Essenes show so marked a kinship to Neo-Pythagoreanism that it must be accounted for either by direct influence or by a common Oriental source; and the Dositheans seem to have derived from Greek philosophy the notion of the eternity of matter, while they adhered to the traditional idea of the future and rejection of the doctrine of a resurrection or the immortality of the soul. It is not probable that Dositheus regarded himself as the Messiah, nor can this be affirmed of either of the political leaders who in A.D. 36 and in A.D. 66 were punished by Pontius Pilate and Ceratus, or of Simon of Gitta, perhaps the most influential Samaritan thinker of all time. It is probable that the repudiation of the sects led the great body of the Samaritans nearer to the Pharisaic party. Especially after the fall of Jerusalem in A.D. 70 the intense zeal for the law formed a bond of union, and the participation of the Samaritans in the revolt under Hadrian tended to improve the relations. Eminent Jewish teachers, such as Rabbi Akiba and Rabbi Simon ben Gamaliel, regarded them as co-religionists and their land as clean. In 195 Jews and Samaritans seem to have taken sides together with Piscennius Niger against Septimius Severus, and as a consequence Shechem was severely punished. During the third century the attitude of the Jews changed. In the reign of Diocletian (284-305) Rabbi Abbaha held that the Samaritans should be treated as pagans. Christianity gradually won its way into Shechem. Bishops of Neapolis and Sebaste were present at the Council of Nicæa (325). During the fifth and sixth centuries the Samaritans were subject to cruel persecutions by the Christian emperors, leading to revolts under Zeno in 484 and Justinian in 529. From the Imperial decrees against them it is evident that Samaritans lived in Egypt and Cyrenaica, in Rome and Constantinople, as well as in Syria. Arabic writers such as Masudi (died c.950), Biruni (died 1038), and Shahristani (born 1086), speak of Samaritan communities in Assyria and Egypt. After the capture of Jerusalem by the Crusaders in 1099, Nabulus freely accepted Christian rule, which continued until Saladin's victory of Lake

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Tiberias in 1187. The Mamelukes of Egypt ordered the Samaritans to wear red turbans in 1301, according to Suyuti and Al-Fath, and Wilhelm of Baldensel in 1336 found such in use. In 1516 Nabulus with the rest of Syria passed under Turkish rule. In answer to letters sent by Joseph Scaliger, epistles were forwarded to him in 1590 from Samaritans in Gaza and Cairo. Pietro della Valla in 1616 and 1625 found Samaritans not only at Nabulus, but also in Cairo, Gaza, Damascus, and Jerusalem. In 1672 Robert Huntington visited Nabulus, where he found thirty Samaritan families. As he was able to read the Samaritan letters and assured them that there were Israelites in England, he left the impression that there were Samaritans in that country. They consequently opened a correspondence with the Sons of Israel, the Samaritans in the cities of the Franks, or more particularly "their brethren, descendants of Israel and Samaritans living in the city of Oxonia." Thomas Marshall answered these letters on behalf of the brethren in Oxford between 1672 and 1685. Three letters were also sent to Ludolf (1685-1689). Niebuhr found Samaritans at Nabulus, Jaffa, Jerusalem, and Damascus in 1766. A letter to Corancez in 1808 states that there were 200 Samaritans in Shechem and Jaffa. A number of letters were written by the Samaritans to Silvestre de Sacy between 1808 and 1826, and during the reign of Louis Philippe an appeal was made by them to the French Government. Robinson visited Nabulus in 1832, Bargès in 1854, and Petermann in 1872. At present fewer than 200 persons survive of the Samaritans, all in Nabulus (q.v.).

While the Samaritans have at all times agreed in recognizing the authority of the law only, and in regarding Mount Gerizim as the only legitimate place of worship, they have manifestly changed their opinion on many other questions under the influence of foreign thought. Thus there is no reason to doubt the practically unanimous testimony of early writers that the Samaritans did not accept the doctrines of a resurrection or the immortality of the soul. But, surrounded as they were by Jews, Christians, and Mohammedans looking forward to a resurrection of the dead, it is not strange that later they should have adopted this belief. It is found in the *Carmina Samaritana*, in the Chronicles of Abulfath, and in the letters to European scholars. Since the Samaritans rejected the prophetic books and the Psalms in which Jewish exegesis especially found references to the Messiah (q.v.), they could not share the hope of a king, a son of David. But Deuteronomy xviii. 18 suggested the coming of a prophet like unto Moses. In the earliest testimony to a Samaritan Messiah (John iv. 25) his character is that of a prophet. In later times the Messiah was called the *Ta'eb*, or 'The Returning One.' It is found in Abulfath, the Songs, and especially in the Gotha Code, 963. Many interpretations of the law, also found among Sadducees and Karaites, have no doubt preserved old traditions. But the limitation of levirate marriage to betrothed virgins, the stricter regulations as to intercourse with pregnant women, and the purification of unclean places by fire, seem to point to Indian and Persian influence. The Samaritans of Nabulus go in pilgrimage to Mount Gerizim annually for each of the three great feasts. They offer sacrifice only at the Passover. See SAMARIA; SHECHEM; SAMARITAN LANGUAGE AND LITERATURE; SAMARITAN PENTATEUCH.

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SAMARKAND, säm'ĕr-känd'. A territory in Russian Turkestan, bounded by the Territory of Syr-Darya on the north and northeast, by the Territory of Ferghana on the east, and by Bokhara on the south and west (Map: Persia, L 1). Area, estimated at over 26,000 square miles. The southern part, which belongs to the Pamir Alai mountain system, is exceedingly mountainous and reaches an altitude of over 18,000 feet, with passes above 12,000 feet. Elevations of 7000 feet are found in the northeast. The northern part of the territory belongs partly to the barren and waterless Famine Steppe and partly to the desert of Kizil-Kum. The principal river is the Zerafshan, which drains with its numerous tributaries the southern part of the territory and feeds the irrigation canals which are so essential to agriculture in Samarkand. The Syr-Darya flows through the northeastern part of the territory. There are also numerous salt lakes, of which Tuz-khan yields large quantities of salt. The climate is hot, dry, and changeable in the lower parts of the territory and severe in the mountainous regions. The mean annual temperature at Samarkand, the capital, is about 55° F. The precipitation is very scanty, and malaria is peculiar to some of the valleys. Samarkand is believed to possess great mineral wealth.

The agricultural land of Samarkand is found principally in the south, along the Zerafshan and its tributaries. The holdings are small and the price of land very high. There are at present in the territory over 1,000,000 acres of land reached by irrigation, and a considerable proportion of it yields two crops a year. The principal products are wheat, barley, and other cereals.

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Cotton and rice are raised in increasing quantities. Sericulture and viticulture are also attaining great importance. Stock-raising is carried on principally by the nomadic Kirghizes. Silk and woolen goods are produced by the natives, and there are a number of large cotton-gin mills and flour mills. Cotton and cereals are the principal exports. The population of the territory in 1897 was 857,847, almost exclusively Mohammedans. The Uzbegs form over two-thirds of the total population.

SAMARKAND. The capital of the territory of the same name in Russian Turkestan, the mediæval capital of Timur, and one of the most famous cities of Central Asia, situated about 5 miles south of the Zerafshan, with which it is connected by a number of canals, on the Transcaspian Railway, and about 140 miles east of Bokhara (Map: Persia, K 2). It lies at an altitude of over 2200 feet. Samarkand consists of the native city and the new Russian town, separated from each other by the citadel. The native city is still partly surrounded by a wall, and its magnificent architectural monuments testify to its former splendor. Its centre is the vast square of Righistan, around which stand three of the madrasahs, for which Samarkand is famous.

Northeast of the square of Righistan stands the ruined madrasah of Bibi-khan, attributed to one of Timur's wives. It incloses a number of mosques and a mausoleum over the graves of the wives of that ruler. The mausoleum with the tombs of Timur, his teacher, and relatives, is crowned with a beautiful dome of blue tiles, and the interior of the room which contains the tombs is ornamented with arabesques and gold inscriptions. The finest mosque of Samarkand, and one of the finest in Central Asia, is that of Shah-Zindeh, outside of the city walls, among the buildings of the summer palace of Timur. It is held in high veneration on account of the remains of Shah-Zindeh (a companion of Timur), which it contains, and its interior decorations are probably the most beautiful in Central Asia.

The buildings of the citadel are now used by the Russians for military purposes. The environs of the city are full of ancient ruins. The Russian part of Samarkand is well built, having many modern public buildings. The industries of the native population are important, and their products comprise cotton and silk goods, wine, leather goods, pottery, and silver and gold wares. The bazaars are still extensive and picturesque, but the commercial importance of the city has decreased since the extension of the Transcaspian Railway to Tashkent and Andizhan. The chief exports are cotton, rice, silk and silk goods, fruit, hides, and wine. In 1897 Samarkand had a total population of 54,900.

Samarkand is identified with the ancient Marakanda, the capital of the Persian Province of Sogdiana, which was destroyed by Alexander the Great in B.C. 329. In the seventh century it was conquered by the Arabs, under whose rule it became a great religious and intellectual centre. Conquered and pillaged by Genghis Khan in the early part of the thirteenth century, Samarkand was restored by Timur at the close of the fourteenth century, and attained its greatest magnificence as the residence of the great conqueror. After the breaking up of the empire of Timur, Samarkand passed to the Emir of Bokhara, from whom it was wrested by Russia in 1868.

SAMAROW, zä'mä-rôv, GREGOR. A pseudonym of the German novelist Oskar Meding (q.v.).

SAMARSKITE (named in honor of the Russian Samarski). A mineral composed of the oxides of a number of rare metals, including cerium, yttrium, columbium, tantalum, etc. It has a vitreous to resinous lustre, and is of a dark or black color. It occurs with the older rocks, and is found in the Ilmen Mountains, in the Urals, in Norway, in Sweden, and in the United States at various localities in Mitchell and McDowell counties, N. C. The mineral finds some use in commerce for the mantle employed by the Welsbach light, although the difficulty in obtaining the required oxides in a pure condition prevents any very great demand for it.

SĀMAVĒDA, sä'mä-vā'dä (Skt., tune-Veda). The name of the third Veda (q.v.).

SAMBAR (from Skt. *śambara*, sort of deer). The largest of Oriental deer (*Cervus unicolor*). It is from 4 to 5 feet high and wears remarkably large and heavy antlers. These spread sometimes to a width of 36 inches, and have very large,

A SAMBAR STAG.

much roughened beams with only two tines, one near the extremity and the other a broad tine set at an acute angle. Its range covers nearly the whole Oriental region, and it is everywhere a deer of the forests. Its hair is coarse and wiry, and forms a mane on the neck; and its color is dark brown, lighter on the buttocks and ventral surfaces. The fawns are not spotted, as is usual with deer. In the Malayan Islands there occur several small sambar-like deer, which are believed by many to be related to the mainland species. One of these doubtful species (*Cervus Philippinus*) belongs to the Philippine and Ladrone Islands, and is scarcely 24 inches tall, and has the brow tines shorter than the terminal prongs. Another closely related Philippine deer is *Cervus Alfredi*, which is larger and has a coat spotted—yellow upon chocolate brown—at all seasons. Consult Lyddeker and other authorities cited under DEER.

SAMBATION, or **SABBATION** (Heb., from *Shabbāth*, Sabbath). A mystic river of Jewish legend. The earliest references are found in Josephus and Pliny. The former (*Bel. Jud.*, vii. 5, 1) says that Titus visited such a river

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in the neighborhood of Beirut and that it flowed only on the seventh day. Pliny (*Nat. Hist.*, xxxi. 18) relates, in connection with other like marvels, that "in Judea there is a river which dries up every sabbath." Both Talmuds refer to it, and the Midrash Rabba to Genesis (§ 11) takes it as a proof of the divine ordinance concerning the Sabbath. In later legend the river became the miraculous protection of the exiles against their enemies. The most extensive form of the story is found in the narrative of 'Eldad' (ninth century, printed in Jellinek's *Beth-Itamidrasch*, iii. 6, Leipzig, 1853-57). Various attempts have been made to locate this strange stream, and it has been identified especially with the Zab in Assyria. Doubtless the story is based on the report of an intermittent stream in some part of the world. The elements of the legend are found in the Alexander Romance (*Pseudo-Callisthenes*), where a river flowing three days with water and three days with sand is assigned to Egypt. There is also a reference to the river as existing in India in the legend of Prester John. Consult: Hamburger, *Realencyclopädie des Judentums*, vol. ii., p. 1071 (Strelitz, 1883); a very full discussion may be found in Lewin, *Wo wären die zehn Stämme Israels zu suchen* (Pressburg, 1901).

SAMBOR, säm'bôr. A town in the Crownland of Galicia, Austria, on the Dniester, 47 miles southwest of Lemberg (Map Austria, H 2). It manufactures oil and linen, and trades in flax, hemp, agricultural produce, and cattle. Population, in 1900, 17,027, mostly Poles.

SAM'BOURNE, EDWARD LINLEY (1845—). An English caricaturist and designer. He was born in London, and educated at the City of London School and at the College of Chester. He was intended for the engineering profession, but, his drawings having attracted the attention of Mark Lemon in 1867, Sambourne was employed by *Punch*, with which journal he has since been connected, having become its chief cartoonist January 1, 1901.

SAMBRE, säN'br'. A river of Belgium. It rises in the extreme northern part of France, in the Department of Aisne, flows northeastward, and enters the Meuse at Namur after a course of 118 miles (Map: Belgium, C 4). It is navigable 100 miles to Landrecies in France, whence the Canal de la Sambre connects it with the Oise. It flows through a very populous region, and forms an important part of the internal waterways of France and Belgium.

SAMBUCUS. See ELDER.

SAMEACA, sä'mâ-ä'kâ. Aborigines of Basilan Island, Sulu Archipelago. See PHILIPPINE ISLANDS.

SĀMKHYA. A system of Hindu philosophy. See SĀNKHYĀ.

SAM'NITES. An ancient people of Samnium or Sabinum, in the mountainous region of Middle and Southern Italy. As their name indicates, they were an offshoot of the Sabines, and belonged to the old long-headed prehistoric race. They comprised four divisions: (1) the Caraceni, on the north, whose capital was Anfidena; (2) the Pentri, in the centre, most powerful of all, with their capital Bovianum; (3) the Caudini, in the southwest; (4) the Hirpini, in the south, capital Beneventum. The earliest account of the Samnites relates to their conflict with the Oscans, whose speech they adopted. On the founding of Rome the Samnites took sides against the city. See ROME.

SAMO'AN ISLANDS, or **SAMO'A** (formerly NAVIGATORS' ISLANDS). A group of islands in the Pacific Ocean, belonging partly to the United States and partly to Germany, and extending from about latitude 13° to 15° S., and from longitude 168° to 173° W. They lie about 4200 miles southwest of San Francisco. The group comprises altogether 14 islands, of which only Savaii (660 square miles), Upolu (340 square miles), Tutuila (54 square miles), and the Manua group (26 square miles) are important. The total area is about 1100 square miles. The islands are all volcanic and mountainous, rising in Savaii to a height of 5413 feet. Savaii shows signs of recent volcanic activity. The region along the coast, however, supports a luxuriant vegetation, and the other islands are forest-clad to the summits of the mountains. The coasts are high and steep, but offer no very good harbors. Earthquakes are frequent, but seldom severe.

The climate is tropical, with a mean temperature of 80° in December and 70° in July. The rainfall is abundant, but the islands are subject to severe hurricanes. The flora is similar to that of other Polynesian groups, and the fauna is extremely limited. The only indigenous mammal is a species of rat, but there are several reptiles, including four species of snake. Among the birds the most remarkable is a species of ground pigeon, the *Didunculus strigirostris*, which is interesting as being a link between the African Treroninæ and the dodo. It is, however, becoming extinct.

The wealth of the islands consists principally in their rich vegetation. The soil is of extraordinary fertility and well watered. The staple product is copra, which is produced on a large scale on European plantations, and which constitutes almost the sole article of export. Fruit is also an important product, and cacao is cultivated on an increasing scale. Aside from agriculture there are few industries. The imports and exports of the German portion of the Samoan group in 1901 were $373,898 and $241,808 respectively. The trade of the American island of Tutuila amounted in the same year to over $100,000, the exports representing less than one-fourth. The chief port of the group is Apia (q.v.), on Upolu, but the best harbor is Pago-Pago, in Tutuila (q.v.).

To Germany belong Savaii and Upolu (qq.v.) and the adjacent islets; and to the United States, Tutuila (q.v.) and the Manua group. German Samoa is administered by an Imperial Governor and a native chief, assisted by a native council. The American possessions are in charge of a naval Governor. There are a number of primary schools maintained by Protestant and Roman Catholic missions. The population of German Samoa in 1900 was 32,612, of whom 347 were European, principally German, British, and American. American Samoa has an estimated population of 5800.

The natives are typical Polynesians linguistically and physically. Their somewhat lighter skin and alleged 'Caucasoid' features have led some ethnologists to class them as 'Indonesian' and to assume their affinity with the white race of the Eurasiatic continent, together with the other Eastern Polynesians—Tongans, Marque-

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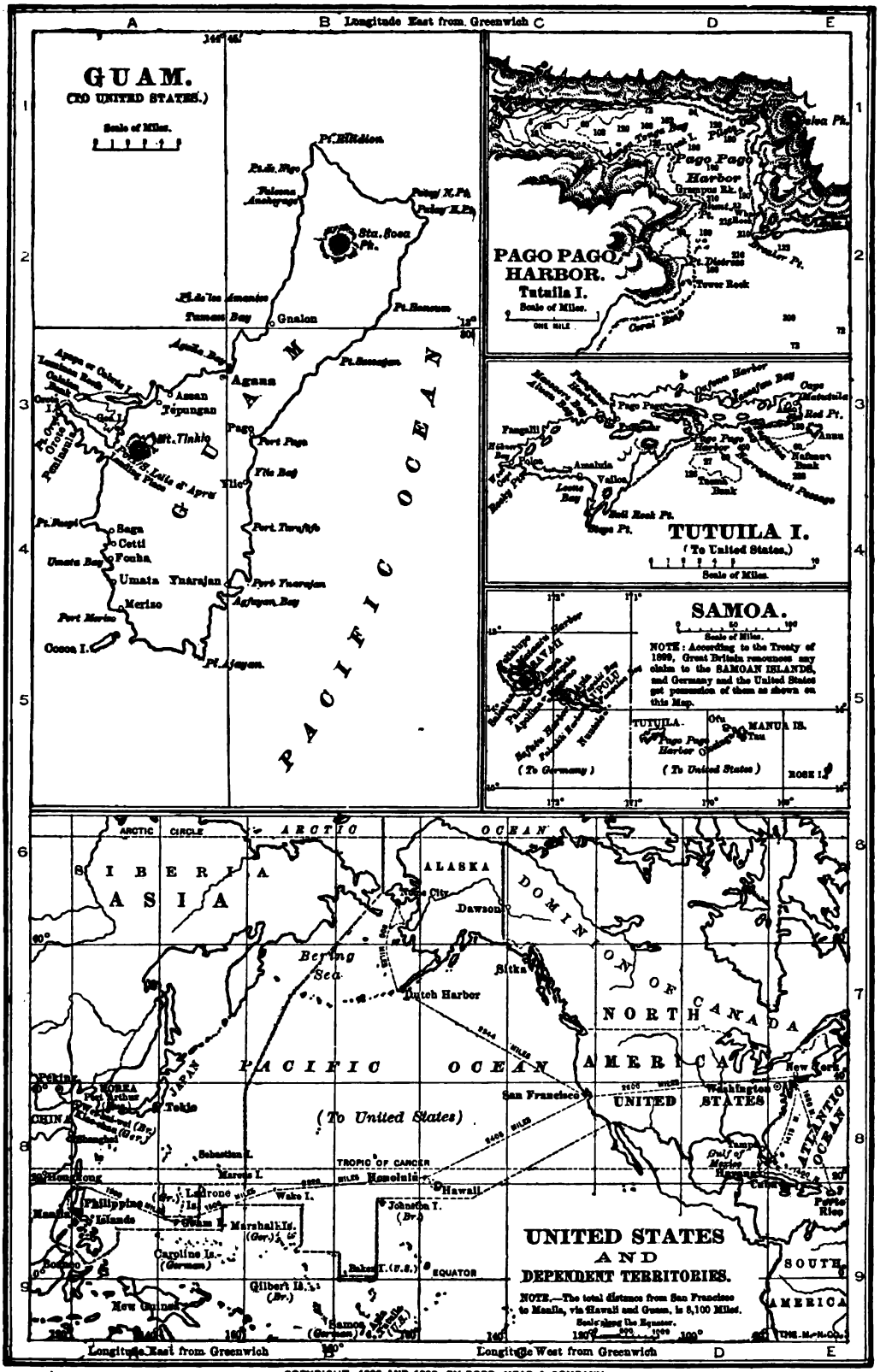

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sans, Hawaiians, Tahitians, etc. Like many other Polynesian peoples, the Samoans are often quite good-looking and are generally well-formed. Tradition and legend make the Samoan Archipelago the centre from which a large portion of the island-world of the Pacific was peopled. The Samoans have always been noted as sailors and boat-builders. They are famous for their legends and tales. Though they have practically all become Christians, the European and later American colonization has not been altogether to their benefit. In matter of population they seem to be about holding their own. Beneath the acquired new religion and borrowed culture survive many old traits and habits. The ancient arts and inventions of the natives are, however, disappearing before the labor-saving devices of the whites.

HISTORY. The Samoan Islands are probably identical with the Baumann's Islands, discovered by the Dutch navigator Roggoveen in 1722. In 1768 Bougainville gave the name of Navigators' Islands to the group. Christianity was introduced by John Williams in 1830. The various islands were ruled by independent chiefs, who acknowledged, however, the nominal authority of a king elected from one of the noble families. After 1868 the islands became subject to continual disturbances, owing to the struggle between rival candidates for the throne. These dissensions were fostered by the representatives of the three foreign Powers possessing considerable interests in Samoa—Germany, Great Britain, and the United States. In 1888 interests hostile to the Germans brought about the election of Mataafa as opposition King to Tamasese, and civil war broke out. Mataafa made himself master of Apia, and in December defeated a small force of German marines. The German consul's truculent action nearly brought on war between the Powers, but a conference was finally called to adjust the difficulties. The Act of Berlin, June 14, 1889, proclaimed the independence and neutrality of the islands and guaranteed the natives full liberty in the election of their King. The interests of the Europeans were to be protected by the creation of a Supreme Court, consisting of a Chief Justice, and the erection of Apia into a municipality, the president of which, as well as the Chief Justice, was to be nominated by the three powers. In 1898 King Malietoa Laupepa died, and Mataafa was elected his successor by an overwhelming majority of the people. The election was contested by Malietoa Tanu, a nephew of the dead King, who was declared by Chief Justice Chambers, an American, rightful King. Fighting thereupon ensued between the forces of Malietoa and Mataafa, who now enjoyed German support. The latter was victorious, and in January, 1899, was recognized as provisional ruler of the islands. In March the United States man-of-war *Philadelphia* arrived at Apia. Rear-Admiral Kautz, after conferring with the representatives of the other Powers, refused to lend further recognition to the Government of Mataafa. The German consul issued a proclamation in favor of Mataafa, who accordingly maintained his attitude of resistance. On March 15th the villages around Apia were bombarded by the British and American ships. Germany again showed herself conciliatory, and by the agreement of December 2, 1899, between Germany, Great Britain, and the United States, the Samoan Islands were partitioned between Germany and the United States. Great Britain received compensation in the Solomon and Toga Islands. On March 16, 1889, a tidal wave destroyed the American and German fleets in Apia roadstead. Of the American vessels, the *Trenton* and the *Vandalia* were sunk, and the *Nipsic* cast on shore, the loss of life being 52 officers and men. Consult: Turner, *Samoa a Hundred Years Ago* (London, 1884); Robert Louis Stevenson, *A Footnote to History* (London, 1892).

SA'MOS (Lat., from Gk. Σάμος; Turk. *Susam Adassi*). An island off the western coast of Asia Minor, separated by a strait (called by the Turks Little Boghaz), about one mile in width, from the rocky promontory of Mycale, of which its mountains are a prolongation. Its length is about 30 miles; its mean breadth about 8 miles. A range of mountains runs through the whole island, attaining its greatest height at the west, where Mount Kerkis (the ancient Cerceteus) reaches an elevation of 4725 feet. Samos is still, as in ancient times, well wooded. Though mountainous toward the north and west, the east and south contain fertile and well-watered ground, and the island exports considerable quantities of grapes, wine, oil, carob beans, and hides; its mountains furnish quarries of marble, and zinc, lead, iron ore, emery, lodestone, and ochre are to be found. The ancient city of Samos was in the southeastern part of the island, near the modern Tigani, where can still be seen the remains of the great moles of the harbor, the ancient fortifications, and the aqueduct cut through the mountain for Polycrates by Eupalinos. About four miles away was the celebrated Heræum, or temple of Hera, one of the largest Greek temples known to Herodotus, but of which only scanty remains are now visible. Excavations begun in 1902 by the Greek Archæological Society are said to have shown that it had two rows of Ionic columns on the sides and three at the ends, and that its dimensions were 54.5 by 109 meters. On the north coast lies the modern capital, Vathy, which derives its name from its deep (Gk. βαθύς, *bathys*) harbor. The population of the island in 1896 was 49,733, mostly Greeks.

The early Greek settlers of the island were said to have come from Epidaurus, and the worship of Hera certainly points to a connection with Argolis. In the early history of the Ionic Confederation Samos seems to have held a prominent place. The inhabitants were bold seamen and built up a large commerce with Asia Minor, the Black Sea, Egypt, and the west. Its greatest splendor was reached under the tyrant Polycrates (q.v.) in the latter part of the sixth century B.C. After his death the island suffered severely from civil strife and the Persians. In B.C. 479 it joined the Greeks and became a member of the League of Delos, and later a free ally of Athens. A revolt in B.C. 440 led to its reduction to the position of a vassal of Athens, but it received renewed privileges in the later years of the Peloponnesian War, when it proved a faithful ally of the Athenian democracy, and was the headquarters for the Athenian fleet. After the fall of Athens it was occupied by Lysander, who established an oligarchical government. By the Peace of Antalcidas (B.C. 387) the island passed into the possession of Persia. In B.C. 365 it was again conquered by the

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Athenians, who expelled the inhabitants, and sent thither a body of Athenian cleruchs, who remained in possession till driven out by Perdiccas after the death of Alexander the Great. From this time the island appears but seldom in history. It took the side of Antiochus and Mithridates against Rome, and in B.C. 84 was joined to the Province of Asia. Under the Byzantine emperors it was of some importance. In 1550 it passed into the hands of the Turks. When the War of the Greek Revolution broke out none were more ardent and devoted patriots than the Samians; and deep was their disappointment when, at the close of the struggle, European policy assigned them to their former masters. The island, however, was placed in a semi-independent position in 1832, when it was constituted as a tributary principality, under a 'Prince of Samos,' who is a Greek Christian appointed by the Sultan, and a national council, which regulates the assessment of the tribute and the internal affairs of the island. The annual tribute amounts to 300,000 piastres. Under this government the island has rapidly increased in population and enjoys a thriving trade. Consult: Panofka, *Res Samiorum* (Berlin, 1822); Guérin, *Description de l'île de Patmos et de Samos* (Paris, 1856); Fabricius, in *Mittheilungen des archäologischen Instituts* (Athens, 1884), on the aqueduct of Eupalinus; Tozer, *Islands of the Ægean* (Oxford, 1890).

SAMOS'ATA. The ancient name of Samsat (q.v.).

SAM'OTHE'RIUM (Neo-Lat., from Gk. Σάμος, *Samos*, Samos + θηρίον, *thērion*, diminutive of θήρ, *thēr*, wild beast). An extinct giraffe, found fossil in Pliocene deposits of the island of Samos, in the Turkish Archipelago. See SIVATHERIUM.

SAM'OTHRACE (Lat., from Gk. Σαμοθρᾴκη, *Samothrakē*), or THRACIAN SAMOS. An island in the north of the Ægean, northeast of Lemnos (*Stalimene*). It belongs to Turkey. It is a rugged and mountainous mass, about 8 miles long by 6 miles broad. Its principal summit (5240 feet) is the highest point in the Greek archipelago. From it the *Iliad* describes Poseidon as watching the battles around Troy, and in spite of the intervening Imbros, the white summit can be seen from that point. During classical times the island plays no part in history, except as the chief seat of the mysteries of the Cabeiri (q.v.). In 1457 it was occupied by the Turks. An attempt to join in the Greek revolution led, in September, 1821, to a savage massacre of the scanty population. At present the island contains but one town of any size, Chosa, situated in a valley a short distance from the shore. The ancient town can still be identified by its fortifications, and the site of the ancient temples has been carefully explored. The first excavators in 1863 and 1867 were French, and their great prize was the superb Nike of Samothrace, now in the Louvre, a very fine example of the Attic school of the end of the fourth century. More important was the thorough clearing of the sanctuary in 1873-75 by the Austrians. Consult: Tozer, *Islands of the Ægean* (Oxford, 1890); Conze, *Reise auf den Inseln des thrakischen Meeres* (Hanover, 1860); and especially, Conze, Hauser, and Niemann, *Untersuchungen auf Samothrake* (Vienna, 1875); and Conze, Humann, and Benndorf, *Neue Untersuchungen auf Samothrake* (ib., 1880).

SAMOYEDS, sä'mō-yēds. A branch of the Finno-Ugrian (Finnic) section of the Ural-Altaic stock of the Mongolian race, inhabiting the tundras of Northeastern Europe and Siberia. As Samoyed peoples are usually reckoned the following: Yurak, nomads of the tundras of the Arctic Ocean from the European limit of the Samoyeds to the Asiatic (Yenesei); Tawgy, east of the Yurak to Khatanga Bay; Yeneseian Samoyeds, on the tundras of the lower Yenesei, between the Yurak and the Tawgy; the so-called 'Ostyak-Samoyeds' of the wooded country on the Obi and its tributaries between Tym and Tchulym; the Soyotes of the Sayan mountain country, etc.; the Mators, on the river Tuba, north of the Sayan Mountains; the Koibals, on the upper Yenesei; the Karagass, on the Uda in the Sayan country; the Kamassinz, about Abakansk and Kansk, between the Angara and the Yenesei. The Yurak and Tawgy are reindeer nomads chiefly, the Ostyak-Samoyeds fishers and hunters for the most part, the Yeneseian Samoyeds partly reindeer nomads, partly hunters and fishers. The nomadic Samoyeds are tent-dwellers, the others live in huts known as *yurts*. The Samoyeds are strongly Mongoloid in physical type, with short stature, brachycephalic head, oblique eyes, and straight hair. Their culture, except where Russian and Chinese influence is felt, is comparatively primitive. There is evidence that they once occupied a much greater territory than at present, particularly to the south, but were driven back by Tatar invasions. The number of the Samoyeds is estimated at about 17,000 of whom about one-third live in European Russia. Consult: Castrén, *Ethnologische Vorlesungen über die altaischen Völker* (Saint Petersburg, 1857); Müller, *Der ugrische Volksstamm* (Berlin, 1837); Pauly, *Description ethnographique des peuples de la Russie* (Saint Petersburg, 1862).

SAMPHIRE (*Crithmum*). A genus of plants of the natural order Umbelliferæ. Common samphire (*Crithmum maritimum*), a perennial, 1½ feet high, is a native of the Mediterranean region of Europe growing chiefly on rocky cliffs near the sea. It is used in pickles and salads for its piquant, aromatic taste. It is easily cultivated in ordinary garden soil. Golden samphire (*Inula crithmoides*), of the natural order Compositæ, is similarly used.

SAMP'SON, WILLIAM THOMAS (1840-1902). An American naval officer, born at Palmyra, N. Y. He graduated at the United States Naval Academy in 1861, and during the following three years was an instructor at the Academy. In June, 1864, he became executive officer of the iron-clad *Patapsco* of the Charleston blockading squadron, and was on board when that vessel was destroyed by a submarine torpedo, although he himself escaped unhurt. The ten years immediately after the Civil War were spent by him partly at sea and partly as an instructor at the Naval Academy. From 1879 to 1882 he commanded the *Swatara* on the Asiatic station, was then for a period in charge of the Naval Observatory, and from 1886 to 1890 was superintendent of the Naval Academy, which under his direction reached a higher standard of efficiency than ever before. When, in 1890, the *San Francisco*, the first modern steel cruiser of the new navy, was put in commission, Sampson, who had reached the grade of captain in the preceding year, was assigned to her command, retaining it until 1892.

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From January, 1893, until May, 1897, he was chief of the Bureau of Ordnance, played a conspicuous part in the building up of the new navy, and came to be recognized as one of the world's greatest authorities on ordnance. To him more than to anyone else was due the adoption of the superimposed turret. After the destruction of the battleship *Maine* in Havana Harbor on February 15, 1898, he was appointed president of the naval court of inquiry to investigate the occurrence. Soon afterwards Sampson was appointed, as acting rear-admiral, to the command of the North Atlantic Squadron. He attained the rank of commodore in regular line of promotion on July 3, 1898. On the same day Admiral Cervera's Spanish squadron was destroyed off Santiago by the ships under Sampson's command, although Sampson himself was absent until the battle was practically over. After the war he served as a Cuban commissioner, was promoted rear-admiral on March 3, 1899, and until September, 1901, was in command of the Boston (Charlestown) Navy Yard. He was retired from active service February 9, 1902. The closing years of his life were clouded by the controversy between his friends and the supporters of Admiral Schley over the question of the command of the fleet during the battle of Santiago, the friends of the latter asserting that in Sampson's absence the credit of the victory belonged to Schley (q.v.).

SAMSAT, säm'sàt, ancient **SAMOSATA.** A village in the Vilayet of Aleppo, Asiatic Turkey, on the Euphrates, 130 miles northeast of Aleppo (Map: Turkey in Asia, H 4). It was the ancient capital of the Syrian Kingdom of Commagene. The place is inhabited by Kurds.

SAMSHUI, säm'shwē' (Chin., Three Waters). A hien or prefectural city and open port of China, in the Province of Kwang-tung, situated about 30 miles west-northwest of Canton at the point where the Si-kiang or 'West River' joins the Pe-kiang or 'North River' to form the Chu-kiang or 'Pearl River,' on which Canton is situated (Map: China, D 7). The city itself, which has a population of about 50,000, stands about half a mile back from the river bank, and is in a state of semi-decay. It was opened to foreign trade in 1897 in accordance with a treaty made earlier in the year with Great Britain. The native junk trade is immense, and there is a considerable native canning industry here of rice-birds, soles, quail, etc.

SAṀSKĀRA, sàms-kä'rà (Skt., completion). The name of the forty essential rites of the first three castes of Hindus. They are the ceremonies to be performed at the procreation of a child, the parting of the mother's hair in the sixth or eighth month of her pregnancy to cause the infant to be a male, on the birth of the child before dividing the navel string, the ceremony of naming the child on the tenth or twelfth day, feeding him with rice in the sixth month, the tonsure in the third year, investiture with the Brahmanical cord in the fifth, eighth, or sixteenth year when he is intrusted to a guru (q.v.) to receive his religious education, the four vows on beginning the study of the Vedas, the ritual bath and return home on the completion of the course, marriage, the five great offerings, the seven small offerings, the seven libations to the fire, and the seven Soma sacrifices. Other texts make certain additions to this list. Consult: Jolly, *Recht und Sitte* (Strassburg, 1896); Hillebrandt, *Ritual-Litteratur* (ib., 1897).

SAM'SON (Heb. *Shimshōn*, from *Shemesh*, sun). An early Hebrew hero whose story is found in the Book of Judges, chs. xiii.-xvi. It is stated that he was the son of Manoah of Zerah, of the tribe of Dan. Manoah's wife was barren, but an angel appeared to her and provided a son, who should be a Nazirite, i.e. a 'consecrated one.' The angel appears a second time at Manoah's prayer and repeats his instructions. No razor is to touch the boy's head. The child is born, and his hair endows him with a supernatural strength. His first feat is his tearing a lion, when on his way to ask a Philistine woman in marriage. Returning the same road, to celebrate his wedding, he finds a swarm of bees in the lion's carcass, and from this propounds a riddle, which, through his wife's treachery, costs thirty Philistines their lives. He leaves his wife for a while and on returning to her finds that she has been given in marriage to another. In revenge he burns the fields of the Philistines by letting loose into them 300 foxes, to whose tails he has attached firebrands. The Philistines in retaliation burn his wife and her house, and Samson avenges this deed by a great slaughter. He escapes to Judean territory, but allows himself to be handed over to the Philistines; by means of his strength he bursts the ropes with which he was tied, and obtaining the jawbone of an ass, kills a thousand Philistines. Betrayed by a harlot at Gaza, Samson's next deed consists in carrying the doors of the city gates with the posts and bars to the top of a mountain at Hebron. Finally he is betrayed by his paramour, Delilah, in the valley of Sorek, to whom he reveals that the source of his strength is his hair. While he is asleep Delilah causes his locks to be shorn and hands him over to the Philistines. His eyes are put out and he is forced to perform servile labor. His hair, however, grows again, and on the occasion of a festival at which Samson is exhibited as a spectacle to the people he pulls down the pillars of the house in which the Philistines had assembled, burying the multitude with himself in the ruins. His body is placed by his relatives in the family sepulchre between Zorah and Eshtaol. The narrative ends with the statement that he judged Israel for twenty years.

Modern critics regard the chapters which contain the Samson story as representing the same circles which produced the Yahwistic narrative of the Hexateuch. (See HEXATEUCH; ELOHIST AND YAHWIST.) Chapter xiv. is thought to show traces of some editorial revision. While thus held to be derived from a single literary source, the narrative is thought to have been pieced together from a number of tales originally independent of one another; chapter xvi., more particularly, represents a supplement added after the narrative had already been closed in an earlier form. In this chapter Samson appears to be at the mercy of harlots and paramours, whereas in chapters xiii.-xv. he is the faithful husband of one wife. Despite the legendary character of the exploits related of Samson, there is no doubt an historical background to the narrative. Samson belongs to the tribe of Dan and to that portion of it whose seat lay to the west of Jerusalem. His adventures with the Philistines reflect the struggle between the Danites and Philistines

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which was a factor that ultimately led to the emigration of most of the Danites (not necessarily all) to the extreme north. (See DAN.) Samson appears to have lived, indeed, after the migration of the Danites to the north, and to have belonged to the 'remnant' which did not scruple to enter into marriage alliances with Philistines while still preserving their hatred of and opposition to the foreign yoke, and striving at various times to cast it off. That he is represented as a 'Nazirite' is due to the desire to invest him with a religious character. The real 'Nazirites' (q.v.) of the Old Testament are men of a quite different type from Samson. Consult Frazer, *The Golden Bough*, i., 370 et seq.; ii., 283 et seq.; iii., 390 et seq. (2d ed., London, 1900). For the Samson story in general, consult the commentaries of Judges, chapters xiii.-xvi., by Moore, Budde, Nowack, and Bertheau; Doorninck, "De Simsonsage," in *Theologisch Tijdschrift*, vol. xxviii. (Leyden, 1894); for the mythological interpretation, consult Goldzinger, *Der Mythos bei den Hebräern* (Leipzig, 1876; Eng. trans., London, 1877); Steinthal, "Die Sage vom Simson," in *Zeitschrift für Völkerpsychologie*, vol. ii. (1861); Sonntag, *Der Richter Simson* (Duisburg, 1890).

SAMSON AGONISTES, ăg'ô-nĭs'tēz. A dramatic poem by Milton (1671). The final triumph of the blind champion of Israel over his enemies, the Philistines, is told in the form of the Greek drama. Handel composed an oratorio "Samson" (1743), with a libretto arranged from the poem.

SAMSUN, săm-sōōn' (Lat. *Amisus*, from Gk. Ἀμισός). An important seaport in the Vilayet of Trebizond, Asiatic Turkey, situated on the southern coast of the Black Sea, about 90 miles southeast of Sinub (Sinope) (Map: Turkey in Asia, G 2). It is badly built and unhealthful. Its commerce is increasing and amounted in 1900 to over $6,000,000. The chief imports are various manufactures, and the exports consist mainly of cereals, flour, and tobacco. Its population is estimated at 13,000. The ancient town of Amisus, which was 1½ miles northwest, was an important Greek settlement.

SAMUEL (Heb. *Shĕmû'ĕl*, name of God, perhaps in the sense of 'son of God'). The son of Elkanah and Hannah, a 'judge' and 'prophet,' who plays a prominent part in Hebrew history just prior to the establishment of the monarchy. The story of Samuel is told in the first of the two books of the Old Testament which bear his name. Modern scholars who think that these books are a compilation find each of the two sources in the account given of Samuel. (See SAMUEL, BOOKS OF.) In the older narrative he is represented as a 'seer,' attached to a town in the hill country of Ephraim, who is consulted by Saul while in search of the lost asses of his father (ch. ix.). Samuel, who has been informed by Yahweh of Saul's coming, receives him cordially and invites him to a sacrificial meal. On the following morning he announces to Saul that Yahweh has designed him to be the deliverer of the Hebrews from the oppression of the Philistines and privately anoints him. Three signs are given to Saul by means of which to test the truth of Samuel's words. The signs are fulfilled and soon the occasion presents itself which enables Saul to raise the siege of Jabesh-Gilead, and amid much enthusiasm he is crowned king. The later narrative is not only much fuller, but accords to Samuel the preëminent position that he occupies in biblical tradition. It begins with the vow made by Hannah, the barren wife of Elkanah, on the occasion of a visit to the sanctuary at Shiloh, to devote the child that is promised to her through Eli to the service of Yahweh. Samuel is born, and after being weaned is handed over to the care of Eli. While engaged in the service of the sanctuary, Yahweh appears to him in the night and announces the approaching downfall of the house of Eli in consequence of the sins committed by the wicked sons of the priest. The defeat of the Israelites by the Philistines at Aphek seems to be the catastrophe meant by the prophecy, though in connection with this event and the subsequent restoration of the ark there is no mention of Samuel. When Samuel next appears he has assumed the rôle of a general adviser to whom the people look for advice; he exhorts them to turn from their idolatrous practices and his intercession with Yahweh brings about the discomfiture of the Philistines. Samuel, moreover, is portrayed as a 'judge' administering justice throughout Israel through a yearly circuit which embraced the chief sanctuaries—Bethel, Gilgal, and Mizpah. On the approach of old age, Samuel associates his two sons with him, but the latter, like the sons of Eli, did not resemble their father. For this reason and because they wanted to be like other nations, the people demand that a king be set over them. Samuel at first opposes the request, which he regards as an act of rebellion against Yahweh, but finally yields, and at a gathering of the people in Mizpah directs that lots be cast for the king. The choice falls on Saul, the son of Kish, the Benjamite. A farewell speech practically closes the public career of Samuel, who, however, lives long enough to announce to Saul that the kingdom will be taken from him because of his disobedience to Yahweh's command. (See SAUL.) He anoints David and after that retires from public gaze. He dies at Ramah and is buried there.

Bearing in mind the general religious character of the later narrative (as set forth in the article SAMUEL, BOOKS OF), it is not surprising to find incidents introduced which are intended to illustrate the narrator's conception of Israel's past. So the supposed opposition of Samuel to the kingdom merely reflects the general point of view maintained in the Pentateuch, which likewise looks with disfavor upon the whole period of royalty and regards its institution as the fatal step in Israel's history. The scene, therefore, between Samuel and the people in which he rebukes them for desiring a king (I. Sam. viii. 10-18) may contain but a slight historical kernel or even be a purely fanciful elaboration. In like manner many scholars regard the farewell speech of Samuel (I. Sam. xii.) as unhistorical and believe that legendary embellishments form a factor in many of the other incidents related of him. Nevertheless they agree that the narrative correctly estimates the importance of the position held by Samuel and the scope of his influence. In many respects he reminds us of Moses, and he is certainly the most striking personage in Hebrew history between Moses and David. Consult the chapters on Samuel in the Hebrew histories of Stade, Wellhausen, Piepenbring, Guthe, and others.

SAMUEL, BOOKS OF. Two of the so-called historical books of the Old Testament. Originally they formed one work, but were divided into two books in the Septuagint and Vulgate and the

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same division has been made by Hebrew editors since Bomberg. In the Septuagint they are called the First and Second Books of Kings. The name is taken from Samuel (q.v.), the principal figure in the opening chapters. The books begin with the high-priesthood of Eli and close with the death of David; four main divisions may be noted: (1) the establishment of the monarchy by Samuel (I. i.-xv.); (2) the narrative of Saul and David and the history of Saul's reign to his death (I. xvi.-II. viii.); (3) David's reign (II. ix.-xx.); (4) an appendix (II. xxi.-xxiv.). The period covered by the work is, roughly, one hundred years, c.1077-977 B.C.

In the opinion of modern critics the books were composed according to the general plan of ancient historiography; that is, they are a compilation of several documents more or less skillfully pieced together with editorial comment and additions revealing the point of view from which the compiler or compilers regarded the past. The compilatory hypothesis accounts for alleged duplication of incidents, contradictions, and inconsistencies in the work as it stands. For example, it is believed that we have two accounts of the choice of Saul as king, two versions of David's introduction to Saul, two narratives of the death of Saul; but little effort seems to have been made to harmonize the chief sources at the disposal of the compiler of these sources; the older is characterized by its graphic style and by the simple straightforward manner in which events are narrated, the later by the introduction of religious views which reflect the standards of a later age and by judgment of events according to those standards. The older narrative may be assigned approximately to the ninth century B.C. and is the work of a writer who belongs to the same school as the Yahwist in the Hexateuch (see ELOHIST AND YAHWIST); the later one belongs to the eighth century and bears traces of the school of thought to be distinguished in the Elohist. Some scholars (as Budde) go so far as to identify these two narratives with the Yahwist and Elohist respectively, but this is not probable. The first combination of the two sources by a redaction took place in the seventh century before the reforms instituted by Josiah (B.C. 621), but in the present form of the two books we may detect a subsequent recension made with the view of bringing the narrative into accord with the religious standpoint of Deuteronomy. This was done mainly by the addition of summaries at the end of important sections and by the expansion of certain incidents which lent themselves to a 'homiletical' sentiment. Other additions were made by a later school of editors of the fifth and fourth centuries B.C., while after the separation of the Books of Samuel from the Books of Kings, the appendix (II. Sam. xxi.-xxiv.) was added to the former embodying miscellaneous fragments, and to this late period likewise belongs the insertion of the psalm known as the Song of Hannah (I. Sam. ii. 1-10).

For the detailed analysis, the distribution of the two main sources, and other problems, consult the commentaries of Thenius-Löhr (Leipzig, 1898); Klostermann (Munich, 1887); Keil (Leipzig, 1875); H. P. Smith (*International Critical Commentary*, New York, 1899); the introductions to the Old Testament by Driver, Kuenen, Cornill, Bleek-Wellhausen, and Kautzsch; Wellhausen, *Text der Bücher Samuelis* (Berlin, 1871); Driver, *The Hebrew Text of Samuel* (Oxford, 1890); Budde, *Richter und Samuel* (Giessen, 1890); Budde's text in the *Sacred Books of the Old Testament* (Leipzig, 1894). See SAMUEL; SAUL; DAVID; KINGS, BOOKS OF.

SAMURAI, sä'mōō-rī' (Jap., guard). The military class in Japan during the feudal period, or a member of that class. Originally the term denoted the soldiers who guarded the Mikado's Palace; later it was applied to the whole military system and included: (1) the *shōgun* or commander-in-chief; (2) the *daimios* or territorial nobles; and (3) their retainers, the privileged two-sworded men, the fighting men, the gentlemen, and the scholars of the country. In 1868 the shogunate, and in 1871 the whole feudal system were abolished; the daimios returned their lands to the Emperor, and they and their retainers were granted pensions. The practice of wearing swords was prohibited. Finally in 1878 the names daimio and samurai were changed to *kwazokū* or 'nobility,' and *shizokī* or 'gentry' respectively. See BUSHIDO; DAIMIO. Consult Knapp, *Feudal and Modern Japan* (Boston, 1876).

SAMVAT, säm'vät (abbreviated form of Skt. *saṁvatsara*, year). The most important system of reckoning time in India. The era is in use in Northern India generally except in Bengal. According to native tradition, the Samvat year was introduced by King Vikrama (q.v.) in B.C. 57. A Samvat given date represents the year last completed. Christian dates are reduced to Samvat by adding 57 to the Christian year. Consult Sewell and Dikshit, *The Indian Calendar* (London, 1896).

SANA, or **SANAA**, sä-nä'. The capital of the Turkish Vilayet of Yemen, Arabia, situated in a beautiful valley at an altitude of 7300 feet (Map: Turkey in Asia, Q 12). The city is surrounded by high brick walls, and dominated by the fortress of Jebal Nigcim. The old white-washed palace of the Imams, now the residence of the Turkish Governor, is a prominent feature. There are numerous mosques, public baths, and caravanserais. The city has excellent bazaars, and there is a flourishing trade in aloes, skins, coffee, indigo, and gum arabic. There are manufactures of carpets, arms, jewelry, silks, and cottons. Sana was taken by the Turks in 1872. Population, estimated at 50,000.

SAN ANDRÉS TUXTLA, sän än-drās' tus'lä. A Mexican town of the State of Vera Cruz, 83 miles southeast of the city of that name and 16 miles from the Gulf coast (Map: Mexico, L 8). The town is situated in a fertile valley producing in abundance maize, sugar cane, cotton, coffee, and other tropical products. Its population in 1895 was 8855.

SAN AN'GELO. A town and the county-seat of Tom Green County, Texas, 299 miles northwest of Austin; on a branch of the Concho River, and on the Gulf, Colorado and Santa Fe Railroad (Map: Texas, D 4). It is important chiefly as a shipping centre for a cattle-raising and farming section, and has some manufactures. Cattle, wool, and pecans are the principal articles of commerce. Population, in 1890, 2615; in 1900, about 4000.

SAN ANTO'NIO. The largest city of Texas, situated 80 miles south by west of the State capital, Austin (Map: Texas, E 5). The Southern Pacific, the International and Great North-

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ern, the Missouri, Kansas and Texas, and the San Antonio and Aransas Pass railroads centre here.

The altitude is 651 feet; average annual temperature 68°, with a relative humidity of 65, and an annual rainfall of 26.76 inches. There are 425 miles of streets, 71 of which are macadamized, and 14 paved with asphalt, mesquite blocks, and vitrified brick. Some twenty parks and plazas add much to the charm of the city.

The various objects of interest include Fort Sam Houston (q.v.), second in size among the military posts of the United States; Breckenridge Park, comprising 200 acres of semi-tropical woodland along the upper course of the San Antonio River; and San Pedro Park, of 40 acres. The river and San Pedro Creek flow through the central portion of the city and unite within its limits. The city hall, the court-house, the Federal building, the Carnegie Library, and the combined market-house and convention hall are noteworthy. Of buildings of historic interest, mention may be made of the famous Alamo (q.v.), San Fernando Cathedral, the Veramendi Palace (one of the Spanish survivals, the scene of the death of Milam in 1835), and, within easy reach on the San Antonio River, the ruins of four of the early Franciscan missions, dating from the period 1720-50.

As a resort for those afflicted with pulmonary diseases, the city has long been noted. Within the past few years it has become favorably known for the curative properties of its hot wells.

San Antonio in 1903 had 143 manufacturing establishments, employing from 10 to 575 persons each. There are large breweries, flouring mills, machine shops, foundries, iron works, and cement works. The wholesale houses control to a great extent the trade of southwest Texas and portions of Northern Mexico. The industries are largely dependent upon the stock interests of this section, but with the greater development of the agricultural possibilities through irrigation, they are becoming each year more diversified and more important. San Antonio is a leading live-stock market.

The government is vested in a mayor and board of aldermen, elected biennially, who control the various administrative departments, except that of public schools, which is under a non-partisan board, chosen at a separate popular election. The assessed valuation of the city in 1902 was $31,600,000. The total disbursements for the year ending May 31, 1902, were $894,483, of which some $170,000 were for special street improvements, $56,322 for the police department, $48,800 for the fire department, and $80,300 for schools. The schools receive also a large appropriation from the State fund. A private corporation is paid annually about $28,500 for street lighting, and $24,000 is expended in like manner for water. The water supply is exceptionally good and is obtained from 12 artesian wells, which furnish the 110 miles of mains with 35,000,000 gallons a day. There are also 19 other wells in the city, with a combined daily capacity of 41,000,000 gallons. In 1897 the city installed a system of 75 miles of sewers at a cost of $500,000.

The first permanent settlement within the limits of the modern city occurred in 1718, although there may have been temporary parties of Spanish *rancheros* in the vicinity a few years previous. In that year occurred the double founding of the mission of San Antonio de Valero and of its accompanying *presidio* of San Antonio de Bexar. These three colonizing elements—ranchmen, missionaries, and soldiers—were joined in 1831 by a colony of 56 persons from the Canary Islands, who formed the first regular municipal organization in Texas, known as the *villa* of San Fernando de Bexar. In 1809 the villa was raised to the rank of a city. Three battles were fought here during the Gutierrez-Magee filibustering expedition of 1813, because of which and of the succeeding proscription San Antonio lost nearly two-thirds of its population. Under Mexican rule its affairs were materially improved, but American migration thither was insignificant. In 1835 the Texan patriot army under Austin invested the place, and on December 9th, after a brilliant assault led by Milam, it capitulated. Here on March 6, 1836, occurred the storming of the Alamo, when the entire garrison of that mission fortress, after a desperate resistance, was massacred by the Mexican dictator, Santa Anna. After the decisive battle of San Jacinto, American pioneers pressed into the region, closely followed by the Germans in the next decade. In 1861 the city was the scene of the surrender of General Twiggs, of the Department of Texas, to the Committee of Safety appointed by the Secession Convention. In 1878 the first railroad reached the city, and since then its growth has been rapid. The population in 1870 was 12,226; in 1880, 20,550; in 1890, 37,673; in 1900, 53,321. Consult: Corner, *San Antonio de Bexar* (San Antonio, 1890); and the files of the *Texas Historical Quarterly* (Austin, Texas, 1897—).

SAN ANTONIO DE LOS BAÑOS, sän ȧntō′nê-ô dâ lôs bä′nyôs. A town of Cuba, in the Province of La Habana, situated on the Havana-Guanajay Railroad, 15 miles southwest of Havana (Map: Cuba, C 3). It is a summer resort, and has mineral springs and baths. Population, in 1899, 8178.

SANBAL′LAT (Heb. *Sanballaṭ*, from Bab. *Sin-uballit*, Sin [the moon-god] gives life). An opponent of Nehemiah, at one time Governor of Samaria, builder of the temple on Mount Gerizim, and father-in-law of the first Samaritan high priest. (See SAMARITANS.) Probably he was a native of Horonaim in Southern Moab. According to Josephus (*Ant.* xi. 7-8) Sanballat was sent as satrap to Samaria by Darius III., Codomanus (B.C. 336-330). When his son-in-law, Manasseh, was driven away by Nehemiah, he promised to secure for him high-priestly power and dignity and to make him governor of all the territory he himself possessed if he would retain his daughter as his wife. As Sanballat was advanced in years, Manasseh expected to receive these favors from Darius. When, contrary to his expectations, Alexander proved stronger than Darius, Sanballat sent troops to aid him in the siege of Tyre and was permitted to build the temple on Gerizim and to instate his son-in-law as high priest, after which he died, in B.C. 332. It is possible that he was Governor of Moabitis before he was sent to Samaria. From Nehemiah's memoirs we learn that Sanballat grieved when he heard of Nehemiah's arrival (ii. 10); that he was angry when the walls were repaired and planned an attack (iv. 7, 8); that he invited Nehemiah

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to a meeting in one of the villages of Ono, which Nehemiah refused to attend (vi. 2-4); that he sent a letter to Nehemiah in which he threatened to report what he had heard from Geshem and others, that the walls were being repaired as a preparation for rebellion and that prophets were appointed to proclaim Nehemiah as king (vi. 5-8); and that he hired Shemaiah, Noadiah the prophetess, and others to trouble the Governor of Jerusalem (vi. 10-14). While all this clearly reveals Nehemiah's suspicions and furnishes good ground for supposing that Sanballat feared the effect of the fortification of Jerusalem and was hostile to Nehemiah, it supplies no evidence of violence, bad faith, or falsehood on his part. Shemaiah's act may have been one of genuine friendship or of mistaken zeal. Consult the commentaries on Ezra and Nehemiah; Kosters, *Het herstel van Israel in het perzische tijdvak* (Leyden, 1893); Marquart, *Fundamente israelitischer und jüdischer Geschichte* (Göttingen, 1896); Torrey, *The Composition and Historical Value of Ezra-Nehemiah* (Giessen, 1896); Schmidt and Cheyne, articles "Nehemiah," in the *Biblical World* (Chicago, 1899); Cheyne, *Jewish Religious Life After the Exile* (New York, 1898); Winckler, *Altorientalische Forschungen* (Berlin, 1899); Sellin, *Studien zur Entstehungsgeschichte der jüdischen Gemeinde* (Leipzig, 1901).

SAN BENEDETTO PO, sän bā'nâ-dĕt'tô pō. A town in the Province of Mantua, Italy, near the Po, 12 miles southeast of Mantua (Map: Italy, E 2). It has an eleventh-century Benedictine monastery with a church built in 1542. Bricks and wine are manufactured. Population (commune), in 1901, 10,790.

SAN BERNARDINO, bĕr'nâr-dē'nō. A city and the county-seat of San Bernardino County, Cal., 63 miles east of Los Angeles, on the Southern Pacific and the Atchison, Topeka and Santa Fe railroads (Map: California, E 4). The vicinity is noted for its beautiful scenery and healthful climate, and for its mud, hot water, and sulphur baths. There are a public library and a handsome court-house. Fruit, hay, and alfalfa are extensively cultivated in the surrounding region, which also has mining and stock-raising interests. The shops of the Atchison, Topeka and Santa Fe Railroad employ 850 men. There are also lumber mills, a box factory, foundries, and machine shops. The government, under the charter of 1883, is vested in a president and board of trustees, who hold office for two years. San Bernardino was founded in 1851 by a company of Mormons, who wished to establish a way station for emigrants to Utah by way of the Pacific. The city stands on or near the site of an abandoned mission of the same name. In 1854 it was incorporated, but on the withdrawal of the Mormons in 1857-58 its importance decreased, and it was disincorporated in 1861. In 1863 its charter was restored. Population, in 1890, 4012; in 1900, 6150.

SAN BERNARDINO, Strait of. One of the two principal passages through the Philippine Archipelago (Map: Philippine Islands, J 7). It separates the island of Sāmar from Luzon, and is part of the route between Manila and the United States.

SAN BLAS, blās. A seaport of Mexico, in the Territory of Tepic, situated in an unhealthful locality on the Pacific coast, 140 miles southeast of Mazatlan (Map: Mexico, F 7). Though its harbor is but an open roadstead, it is the most frequented port on the Pacific coast of Mexico next to Acapulco and Mazatlan. The exports amount to about $350,000 annually, and consist chiefly of silver, lumber, rice, coffee, and mescal. A railroad runs to Tepic, and is being extended to Guadalajara. Population, about 4000. Formerly the town was an important city with a population of 20,000.

SAN BLAS, Cape. See Cape San Blas.

SAN'BORN, Franklin Benjamin (1831—). An American journalist and social reformer, born at Hampton Falls, N. H. He was graduated at Harvard in 1855, and in 1856 was made secretary of the Massachusetts Kansas Committee, which led to his knowledge of John Brown, with whose fame he was closely connected. Later he was active in the Massachusetts State Board of Charity, of which he was secretary (1863-68) and chairman (1874-76). He reformed the Tewksbury Almshouse, aided in founding the Massachusetts Infant Asylum and the Clark Institution for Deaf Mutes, and in ameliorating the treatment of the insane. In 1879 he was made inspector of charities. He was also active in the organization of the American Social Science Association, of which he became (1873) chief secretary, and he aided in establishing the Concord Summer School of Philosophy (1879). For several years, beginning with 1868, he was editorially connected with the Springfield *Republican*. He wrote *Lives* of Thoreau (1882), of John Brown (1885), his most important book, of A. Bronson Alcott, Emerson, and Dr. S. E. Howe; and edited William E. Channing's *Wanderer* (1871); Bronson Alcott's *Sonnets and Canzonettes* (1882); his *New Connecticut* (1886); and for a time *The Journal of Social Science*. A brief study of Emerson appeared in the *Beacon Biographies* (1901); and later he edited essays of Thoreau and poems by W. E. Channing the younger.

SANBORN, John Benjamin (1826-1904). An American soldier, born in Epsom, N. H. He studied at Dartmouth College, and in 1854 was admitted to the bar. On the outbreak of the Civil War, as adjutant-general and quartermaster-general of Minnesota, he organized and equipped the Minnesota troops, and early in 1862 became colonel of the Fourth Minnesota Volunteers. He took part in the battles of Corinth, Port Gibson, Raymond, Jackson, and Champion Hills, and in the Vicksburg siege, and was promoted to be brigadier-general, his commission being dated August 4, 1863. Placed in command of the District of Southwestern Missouri in October, 1864, he fought a number of successful engagements, and effected treaties with Indian tribes hitherto hostile.

SAN CARLOS, kär'lōs. A town of the Province of Nuble, Chile, 208 miles south of Santiago, with which city it has direct railway connection (Map: Chile, C 11). The old town is irregularly built, but the newer portion above the railway station is much better constructed. Its population, in 1885, was 7277.

SAN CARLOS. A town of the State of Zamora, Venezuela, 105 miles southwest of Caracas (Map: Venezuela, D 2). Population, in 1891, estimated at 10,420.

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SAN CARLOS. A town of Luzon, Philippine Islands, in the Province of Pangasinán, situated about 10 miles southeast of Lingayén, near the Manila-Dagupan Railroad (Map: Philippine Islands, E 4). Population estimated, in 1899, at 23,934.

SAN CARLOS, ORDER OF. A Mexican order for women, founded in 1865 by Emperor Maximilian and extinguished at his death. The decoration was a green and white Latin cross bearing the image of Saint Charles.

SAN CATALDO, kä-täl'dô. A town in the Province of Caltanissetta, Sicily, 4 miles by rail west-southwest of Caltanissetta (Map: Italy, H 10). It has a handsome church with relics of Saint Cataldus. There are sulphur mines, oil refineries, and a trade in grain and fruit. Population (commune), in 1901, 17,941.

SANCHEZ COELLO, sän'châth kô-äl'yô, ALONZO. See COELLO, ALONZO SANCHEZ.

SANCHO PANZA, *Sp. pron.* sän'chô pän'thä. The lazy, good-natured, pot-bellied laborer who accompanied Don Quixote as his squire in Cervantes's romance. Famous for his proverbs and shrewd sense, he serves as an admirable foil to the knight, and at last becomes Governor of Barataria, over which he presides with grotesque dignity.

SANCHUNIATHON, sän'kû-nĭ'â-thŏn, or **SANCHONIATHON** (Lat., from Gk. Σαγχουνιάθων, *Sanchouniathōn*). The reputed author of a Phœnician history of Phœnicia and Egypt, called Φοινικικὰ ἱστορία, or Τὰ Φοινικικά. Philo Herenius, of Byblus, a Greek writer (born c. 64 A.D.), claims to have translated Sanchuniathon's history into his own tongue; but of this translation all is lost save a few fragments relating to mythology and cosmology, which have been preserved by Eusebius in his *Præparatio Evangelica*. According to Philo, Sanchuniathon lived during the reign of Semiramis, the mythical Queen of Assyria, and dedicated his book to Abibalus, King of Berytus. Athenæus, Theodoret, Porphyry, and Suidas, on the other hand, speak of him as an ancient Phœnician who lived 'before the Trojan War.' There is also a discrepancy between the various ancient writers respecting the number of books contained in the *Phœnikika*, whether eight or nine. The genuineness of the fragments ascribed to Sanchuniathon has been the subject of a prolonged discussion. The present position of scholars may be summed up by the statement that while the existence of a Phœnician writer of the name of Sanchuniathon is denied, it is believed that Philo embodied in his work current traditions that belong to a relatively high antiquity, and culled his information from various sources. A forgery purporting to contain Philo's complete translation of Sanchuniathon and to have been found at the Convent of Santa Maria de Merinhao, was published by Wagenfeld (Bremen, 1837) and translated into German (Lübeck, 1837). For the text, consult: *Sanchuniathonis Fragmenta* (Leipzig, 1826); Müller, *Fragmenta Historiarum Græcorum* (Paris, 1848). There is an English translation in Cory, *Ancient Fragments* (London, 1876); for discussion of the problems involved, consult: Morer, *Die Phönizier* (Bonn, 1849); Renan, *Mémoire sur Sanchuniathon* (Paris, 1858); Pietschman, *Geschichte der Phönizier* (Berlin, 1889); Gutschmid, *Kleine Schriften* (Leipzig, 1890).

SAN CRISTÓBAL DE LOS LLANOS, krĕs-tō'bäl dä lŏs lyä'nŏs (formerly CIUDAD DE LAS CASAS). A town of Mexico, in the State of Chiapas, situated on the plateau forming the base of the Yucatán Peninsula, 6500 feet above the sea (Map: Mexico, N 9). It is surrounded by ruins of ancient Indian cities, and is built on the site of one of these, Huizacatlán. It has a cathedral, and was the residence of Bishop Las Casas, the famous defender of the Indians. Up to 1892 it was the capital of the State. Population, in 1895, 12,000.

SAN'CROFT, WILLIAM (1617-93). Archbishop of Canterbury, the most distinguished of the non-jurors (q.v.). He was born in Suffolk, and educated in the grammar school of Bury Saint Edmunds and in Emmanuel College, Cambridge. The restoration of Charles II. brought Sancroft the post of chaplain to Cosin, Bishop of Durham. After several preferments he was made Archdeacon of Canterbury in 1668, and in 1677 he became Archbishop of Canterbury. In 1688 James II. committed him and six other bishops to the Tower for presenting a petition stating their reasons for refusing to read from their pulpits the Declaration of Indulgence (q.v.). When James asked Sancroft to sign a declaration expressing abhorrence of the Prince of Orange's invasion, he refused, and afterwards even concurred in an invitation to William of Orange to intervene in English affairs. His later attitude to William is to be explained by the fact that though he was in favor of declaring James incapable of ruling, and of appointing William *custos regni*, his oath of allegiance to James prevented him from supporting William as King. Accordingly he absented himself from the convention held by the lords spiritual and temporal to meet the new monarch, and after the settlement he refused, along with seven other bishops, to take the oath of allegiance to the Government, in consequence of which he was suspended by act of Parliament, August 1, 1689. Consult: Lathbury, *History of the Non-jurors* (London, 1845); Burnet, *History of His Own Time* (Oxford, 1833); Ranke, *History of England, Principally in the Seventeenth Century* (Oxford, 1875).

SANCTIFICATION (Lat. *sanctificatio*, from *sanctificare*, to make holy, from *sanctus*, holy + *facere*, to make). In Protestant theology, the process by which the Holy Spirit renews man in the divine image, destroying within him the power of evil, and quickening, educating, and strengthening in him the life of goodness and holiness. It is distinguished from justification, which is considered a judicial act on the part of God's free grace, liberating the sinner from condemnation, absolving and pardoning him once for all.

SANCTI SPÍRITUS, säŋk'tē spē'rē-tus. A town of Cuba, in the Province of Santa Clara, about 20 miles from the southern coast of the island and 50 miles southeast of Santa Clara (Map: Cuba, F 5). It was founded by Diego Velazquez in 1514, and has narrow, crooked streets, and an old church with a high tower dating from the foundation of the town. A railroad runs to the port of Tunas. Population, in 1899, 12,696.

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SANCTUARY. A sacred or consecrated place; sometimes applied specifically to a place which gives protection to those threatened by punishment or vengeance. Among the ancient Greeks a famous sanctuary was a sacred precinct on the northeast shore of the Isthmus of Corinth inclosed by walls and containing rich temples, altars, a theatre, and a stadium where the Isthmian games were celebrated. Generally throughout Grecian civilization the temples, or at least certain of them, afforded protection to criminals, whom it was unlawful to drag from them, although the food which was supplied might be intercepted. Among the Jews there were cities of refuge to which those might flee who had killed a man unawares. The more ancient canon law of the Western Church recognized this protection to those who had committed crimes of violence as continuing for a limited period, sufficient to admit of a composition of the offense, or at least to give time for the first heat of resentment to pass, before the injured party could seek redress. In several parish churches of England there was a stone seat beside the altar for those fleeing to the peace of the Church. One of these seats remains at Beverley and another at Hixham. In England it was not till 1534 that persons accused of treason were barred the privilege of sanctuary. By an act passed in 1624 the privilege of sanctuary for crime was finally abolished. Various precincts, however, in and about the old city of London continued to afford shelter to debtors. Whitefriars, adjacent to the temple known by the cant name of 'Alsatia,' was such a sanctuary where privilege from arrest prevailed unless against the writ of the Lord Chief Justice. These places were found to harbor conspirators against the Government, and they were finally broken up by King William in 1697.

SANCY, sȧn'sē', Nicolas Harlay de (1546-1629). A French soldier and diplomat, born in Paris. He belonged to the younger branch of the great Protestant family of Harlay. He became a Catholic for a few months in 1572 in time to escape death in the Massacre of Saint Bartholomew, but soon returned to the Huguenot faith. Subsequently he went to Switzerland to secure mercenaries for Henry III., pledging his own valuable jewels, among them the famous Sancy diamond. (See Diamond.) His devotion to the cause of Henry IV. caused the latter to appoint him in 1589 superintendent of finances. Later he served as Ambassador to England, and held high rank in the army. His second and final conversion to Catholicism, which his contemporaries charged to his ambition, was satirized by D'Aubigné in his *Confession de Sancy*.

SAND. A loose, incoherent mass composed of fine quartz grains, usually with a small proportion of mica, feldspar, magnetite, and other resistant minerals. It is the product of the chemical and mechanical disintegration of rocks under the influences of weathering and abrasion. When freshly formed the particles are usually angular and sharply pointed, becoming smaller and more rounded by attrition when blown about by the wind or transported by water. Sand is an important constituent of most soils, and is extremely abundant as a surface deposit along the courses of rivers, on the shores of lakes and the sea, and in arid regions.

SAND, sȧnd, George (1804-76). The name assumed by Armantine Lucile Aurore, Baroness Dudevant, a French novelist. She was born in Paris, July 5, 1804. Her father, Maurice Dupin, an officer, was the grandson of Marshal Saxe, the illegitimate son of Augustus II., King of Poland. She inherited a dashing temperament, democratic sympathies, and a taste for adventure; but all this was modified first by the training of her aristocratic grandmother, with whom she remained till thirteen at the ancestral homestead in Berry, then by three years at a Parisian convent (called *le couvent des Anglaises*), where she developed a strain of mystic idealism. On her grandmother's death she returned to Berry (1820), and after two years was persuaded to marry Casimir Dudevant (1822), a country squire. With him she lived eight years. They had two children, to whom she was devoted. From 1829 she lived mainly in Paris on a slender allowance, eked out by decorative painting; in 1831 a partial separation was arranged, and this in 1836 was made final. A ferment of blighted hope, social discontent, intimate knowledge of the aristocracy, democratic sympathy, contact with nature, ideal aspiration, and religious sentiment were all blended in her first novel *Indiana* (1832). Meantime she had been writing insignificant articles in the *Figaro*, at the office of which she met Jules Sandeau. With him she wrote *Rose et Blanche*, signed 'Jules Sand,' whence she took her own pseudonym. In the next forty-three years she published eighty-four novels, besides writing ten volumes of *Correspondance*, eight of *Mémoires*, and five of *Drames*. Her work falls into four periods. The first, counting as typical *Valentine* (1832), *Lélia* (1833), *Jacques* (1834), *André* (1835), *Leone Leoni* (1835), closes with *Mauprat* (1837). Here the effort is to project her own marital experiences and so assert an intense individualism. But all reflect the grief and pride of a neglected wife. The novels after 1834 reflect also the first bitter disillusionment that came from her putting in practice the theory that passion should be the rule of life. She had formed a very close attachment with the poet Alfred de Musset; she journeyed with him to Italy (1833-34) and became estranged from him under circumstances much written of and not yet wholly clear. Her own version of the situation is to be found, with some novelistic embellishment, in *Elle et lui* (1859). Musset's brother Paul endeavored to represent his in *Lui et elle* (1859). This shipwreck of passion, while it weakened Musset's character, greatly deepened hers.

Returning to Paris, she made new friends, among them Chopin, Balzac, Liszt, the painter Delacroix, the philosophic priest Lamennais, and, after three years of arrested development during which she wrote *La dernière Aldini* (1838), *Les maîtres Mosaïstes* (1838), *Le compagnon du tour de France* (1840), and *Spiridion* (1840), she dazzled the world for eight years with brilliant pleas for the socialistic revolution (1848), giving new life to romanticism by sympathetic study of the working class and the peasantry, in which she preceded Sue, Hugo, and Balzac. This is her second manner, typical of which are *Consuelo* (1843), its sequel *La comtesse de Rudolstadt* (1844), *Le meunier d'Angibault* (1845), and *Le péché de*

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M. Antoine (1847). But the object lessons of the Revolution cooled her enthusiasm, and after Napoleon's accession she lived quietly at Berry. Here she developed a third manner, idyllic naturalism, forerunners of which had been *Jeanne* (1844) and *La mare au diable* (1846). Her more noteworthy novels of this type are *François le Champi* (1849), *La petite Fadette* (1849), and *Les maîtres sonneurs* (1853). The wider social studies of her fourth manner began in 1860, after some dramatic experiments, with the psychologic study *Jean de la Roche*, and this style counts as its best novels *Le marquis de Villemer* (1861) and *Mlle. la Quintinie* (1863). Through her work there quivers a passionate rebellion against convention, moral or social. She played a great part in the social emancipation of women, without having either an original or a definite social theory. Her nature was simple, affectionate, patient, kind, without vanity, without pedantry, large and frank.

Her collected works appeared as *Romans et nouvelles*, 84 vols.; *Mémoires, souvenirs, impressions, voyages*, 8 vols.; *Théâtre*, 4 vols.; *Théâtre de Nohant*, 1 vol. A *Life and Study* by Professor Caro, in the "Grands écrivains français" series (Paris, 1888), is translated by Masson in "Great Writer Series" (London, 1888). There is an English monograph by Bertha Thomas (London, 1889). Consult also: Taine, *Nouveaux essais* (Paris, 1865); Faguet, *XIXème siècle;* Brunetière, *Poésie lyrique*, vol. i. (ib., 1894); but especially George Sand's own *Histoire de ma vie*, published first as a feuilleton in *La Presse* (ib., 1854), afterwards in book form (ib., 1876); and *Correspondance* (6 vols., ib., 1882-84), especially the letters to Flaubert (q.v.). There are many translations of George Sand's chief novels. The most convenient uniform edition is in 20 vols. (Philadelphia, 1901).

SAND, zänt, Karl Ludwig (1795-1820). A German student, known as the assassin of the dramatist August Friedrich von Kotzebue (q.v.). He was born at Wunsiedel, in Bavaria; studied theology at Tübingen and Erlangen, and in 1817 became affiliated with a Burschenschaft (q.v.) at Jena. He considered it his mission to kill Kotzebue, whom he regarded as a spy of the Russian Court, and one of the chief enemies of popular liberty. Entering the residence of Kotzebue in Mannheim, March 23, 1819, he murdered him with a dagger. He failed in an attempt on his own life, and was decapitated May 20, 1820. The death of Kotzebue spurred on the champions of reaction to greater activity and led to the enactment of the Carlsbad Decrees (q.v.). Consult Hohnhorst, *Uebersicht der gegen Sand geführten Untersuchung* (Stuttgart, 1820).

SANDAL. See Shoes and Shoe Manufacture.

SANDALPHON. One of three angels in the Rabbinical system of angelology who receive the prayers of Israelites and weave crowns from them. Longfellow used the legend in his poem "Sandalphon."

SAN'DALWOOD (from OF., Fr. *sandal*, *santal*, from ML., Neo-Lat. *santalum*, from Gk. σάνταλον, *santalon*, σάνδανον, *sandanon*, from Ar. *ṣandal*, Pers., Hind. *sandal*, *candan*, from Skt. *candana*, sandal-tree, from *cand*, Lat. *candere*, to shine). The compact, fine-grained, costly wood of several species of the genus Santalum, of the natural order Santalaceæ, natives of the East Indies and tropical islands of the Pacific Ocean. It is used for making small ornamental articles and cabinets and is remarkable for its fragrance, due to an essential oil, which is so obnoxious to insects that they will not attack articles stored in sandalwood receptacles. White sandalwood, the most common kind, is derived from a small tree (Santalum album), a native of mountains in the south of India and the Indian Archipelago. It is much branched, and resembles myrtle in its foliage and privet in its flowers. The tree is seldom more than 30 feet in height and a foot in diameter. A kind sometimes called yellow sandalwood is produced by Santalum Freycinetianum of the Indian Archipelago and Hawaiian Islands, from which it is exported to China. Santalum Yasi, which yields the much-valued sandalwood of the Fiji Islands, is a tree which has been almost extirpated in Hawaii, Fiji Islands, and elsewhere in consequence of the demand for its wood in commerce. A less valuable sandalwood (Exocarpus latifolius) is exported from some of the South Sea Islands. Successful attempts have been made to cultivate Santalum album in India and large plantations have been made of it. Red sandalwood, or sanders, is the produce of Pterocarpus santalinus, of the natural order Leguminosæ, a native of tropical Asia, particularly of the mountains of the south of India and of Ceylon. The dark-red, black-veined heartwood, which sinks in water, is used as a dyestuff, and to color certain druggists' preparations. It is also the basis of some tooth-powders. The wood of Adenanthera pavonia, a relative of the acacias, is sometimes called red sandalwood, or redwood.

SANDALWOOD ISLAND, or Sumba. One of the Sunda Islands, in the Malay Archipelago, belonging to the Netherlands and situated 40 miles south of the western end of Flores (Map: East India Islands, E 7). Area, 4283 square miles. It consists of an elevated plateau 3000 feet above the sea with steep and rocky coasts, and contains forests of valuable timber, including sandalwood and ebony. Some timber is exported, together with cotton, spices, and edible birds' nests; horses of an excellent breed are exported. The island forms a part of the Residency of Timor, and has a population estimated in 1895 at 200,000, belonging to the Malay race.

SANDARAC (OF. *sandarac*, *sandarache*, *sandarax*, Fr. *sandaraque*, from Lat. *sandaraca*, *sandaracha*, from Gk. σανδαράκη, *sandarakē*, red sulphuret of arsenic, from Skt. *sindūra*, minium), or Sandarac Resin. A friable, dry, almost transparent yellowish-white resin, which is imported from the north of Africa. It is completely soluble in oil of turpentine, but not entirely in alcohol. When heated, or sprinkled on burning coals, it emits an agreeable balsamic smell. It exudes from the bark of the sandarac tree (*Callitris quadrivalvis*, natural order Coniferæ), a native of the northwest of Africa, especially Algeria. The best qualities of sandarac are brought into commerce in the form of small transparent tears of a light-yellow color. The specific gravity of sandarac varies between 1.5 and 1.9. The resin has a faint aromatic odor and a bitter taste. The quantity of sandarac used is not great; it is employed mostly for the same purposes as mastic (q.v.). The finely powdered resin is rubbed, as

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pounce, on the erasures of writing-paper, after which they may be written upon again without the ink spreading.

SAN'DAY, WILLIAM (1843—). An English theologian, born at Holme Pierrepoint, Nottingham, and educated at Balliol and Corpus Christi colleges, Oxford. He was fellow of Trinity in 1866 and lecturer until 1869. From 1876 to 1883 he acted as principal of Hatfield's Hall, Durham; was professor of exegesis and tutorial fellow of Exeter until 1895; and then was appointed Lady Margaret professor of divinity and canon of Christ Church, Oxford. He published *Authorship and Historical Character of the Fourth Gospel* (1872); *The Gospels in the Second Century* (1876); a commentary on Romans and Galatians (1878); *Inspiration*, the Bampton Lectures (1893); a commentary on Romans (1895); and *The Catholic Movement* (1899). He was an editor of the *Variorum Bible* (1880-89) and assisted Wordsworth on the second part of the *Old Latin Biblical Texts* (1886).

SAND-BLAST. A device for engraving, cutting, and boring glass, stone, metal, or other hard substances, by the percussive force of a rapid stream of sharp sand driven against them by artificial means. The process was invented by Gen. Benjamin C. B. Tilghman, of Philadelphia. The means of propulsion may be either an air or a steam blast, the former being produced by a fan revolving with great velocity or by air compressors, the latter by a boiler at high pressure. In either case the abrading material, which is usually common hard sand, although small granules of iron or crushed quartz are occasionally used, is directed by a tube upon the object to be cut or engraved. The engraving of the surface of glass with ornamental figures is accomplished by laying upon it patterns of the desired objects cut out of some resistant medium in the manner of stencils. Another method very commonly used is to cut the proposed pattern in sheet copper or brass, which is then placed over the glass, a brush of melted beeswax being drawn over the whole. The stencil is then raised, and the pattern in exposed glass may then be operated upon by the blast. The ornamentation of glass in colors may also be performed by a sand-blast. The sand-blast is also useful in the cutting of ornaments and inscriptions upon stone. Iron stencils are sometimes used for the purpose, but the most satisfactory material is found to be sheet rubber of about one-sixteenth of an inch in thickness. This is cemented upon the stone and a movable jet pipe is caused to traverse the surface of the latter until the exposed portions have been sufficiently abraded. The wear upon the rubber itself is slight and the same stencil may be used over and over again. Another use to which the sand-blast has been successfully put is in turning blocks of stone into circular and other forms in the lathe. Upon wood the action of the sand-blast is not so satisfactory. The sand-blast is frequently used for cleaning the scale and rust from iron and steel structures to prepare them for painting.

SANDBY, sän'bĭ, PAUL (1725-1809). An English water-color painter, engraver, and caricaturist, born in Nottingham. With his brother Thomas, he obtained employment in the military drawing department in the Tower of London. He settled at Windsor in 1751, where his brother was deputy ranger of the great park, and subsequently made many drawings of Windsor and Eton, and also etched plates from his own designs. He became drawing master at Woolwich Military School in 1768, and in the same year was one of the first 28 members of the Royal Academy, where he exhibited water-color landscapes from 1769 until 1809. He greatly improved water-color painting, and united high qualities as a draughtsman to considerable artistic feeling. His Scotch etchings were published in 1765, and his Welsh aquatints in 1775. There are works by him in the Royal Library at Windsor, at South Kensington, and in other collections.—His brother THOMAS (1721-98), was also one of the original members of the Royal Academy, and its first professor of architecture. He built the Freemason's Hall in Lincoln's Inn Fields in 1776, and as landscape gardener and engineer laid out Windsor Park and Virginia Water. Consult Sandby, *Thomas and Paul Sandby* (1892).

SAND-CRICKET. One of the long-horned grasshoppers of the family Locustidæ and genus Stenopelmatus; not a true cricket. See GRASSHOPPER.

SAND-DAB. A reddish-brown turbot (*Hippoglossoides platessoides*) of the deep waters of the North Atlantic, closely related to the halibut. It is useful for food, and is taken commonly on the coasts of Great Britain and Scandinavia, and from Maine to Greenland. Two other species live in the North Pacific.

SAND-DOLLAR. One of the smaller echinoids of the order Clypeastroidea, which have the test very much flattened and approximately circular. Those species which have the test perforated by elongated holes, usually five or six in number, are often called 'key-hole urchins,' and some of the larger species, without perforations, are called 'sea-worms.' The common sand-dollar of the Eastern United States is *Echinarachnus parma*, and is locally abundant on sandy bottoms in comparatively shallow water, from New Jersey northward. It is two or three inches across, and reddish-brown in color.

SANDEAU, sän'dō', LÉONARD SYLVAIN JULES (1811-83). A French novelist and dramatist, born at Aubusson. He studied law in Paris, turned to journalism, wrote *Rose et Blanche* (1831) with George Sand (q.v.), was made keeper of the Mazarin Library in 1853 and Academician in 1858. He died in Paris. His better novels are *Mlle. de la Seiglière* (1848, dramatized, 1851) and *La maison de Penarvan* (1858). He collaborated with Augier (q.v.) in turning his inferior novel *Sacs et parchemins* (1851) into the great comedy *Le gendre de Monsieur Poirier*, and wrote with him, also, *La pierre de touche*. His special domain is the conflict between a poor but proud aristocracy and the wealthy bourgeoisie, brought politically to the front in 1830. Consult Saintsbury, *Essays on French Novelists* (New York, 1891).

SANDEC, sän'dĕk. A town in Austria. See NEU-SANDEC.

SAND-EEL, or SAND-LANCE. One of a group of small fishes (Ammodytoidei) consisting of a single family, the Ammodytidæ, whose relationships are uncertain. All of the sand-eels are small lanceolate creatures, with long, low, and

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fragile dorsal and anal fins, and no ventral fins; the tail is small and forked. The skin has many transverse folds running obliquely backward and downward, and is clothed with small cycloid scales. They are carnivorous fishes that swim in large schools near the shore in all northern regions, and bury themselves in the sand near the tide mark. They are collected as bait, make an excellent pan-fish, and furnish abundance of food for salmon and other valuable fishes. See Plate of MULLETS AND ALLIES.

SAN'DEMAN, ROBERT (1718-71). Leader and with John Glas (q.v.) founder of the sect of Glassites or Sandemanians. He was born at Perth, Scotland, studied for a short time at Edinburgh University, and engaged in the linen trade. Coming under the influence of Glas, he adopted his views, became an elder in his church (1744), and married his daughter. He became a Glassite preacher and in 1760 went to London, where he formed a congregation, whose members took the name of Sandemanians. Four years later he removed to America and established a church at Portsmouth, N. H. (1765), and other points in New England. He died at Danbury, Conn. His works include three *Letters on* [J. Hervey's] *Theron and Aspasio* (1757), which attracted much attention; *An Epistolary Correspondence between S. Pike and R. Sandeman* (1760); *Some Thoughts on Christianity* (1764); *Discourses* (with a biographical sketch, 1857). Consult Andrew Fuller, *Strictures on Sandemanianism* (Nottingham, 1810).

SANDEMANIANS, or GLASSITES. A sect founded in Scotland by John Glas (q.v.) about 1730 and extended in England and America by his disciple and son-in-law Robert Sandeman (q.v.). The sect was called Glassites in Scotland, but Sandemanians became the more usual designation in England and America. The main doctrine of Glas was that all national establishments of religion and all interference of the civil authority in religious affairs are inconsistent with the true nature of the Church of Christ. Both Glas and Sandeman held that saving faith consists in 'a bare belief of the bare truth,' which belief they regarded as the fruit of divine grace and the work of the Holy Spirit. It was considered necessary to separate from the communion and worship of all societies which appeared not to profess the 'simple truth,' and it was even held unlawful to join in prayer with any one not a brother or sister in Christ. The Lord's Supper was observed weekly, and 'love feasts' or dinners were held every Sunday at the members' houses. There was a communistic tendency in that every one was required to consider all that he had at the service of the poor and the Church, and forbidden to lay up treasures on earth for any future or uncertain use. The discipline was primitive and severe; the kiss of charity was given at their meetings and foot-washing of fellow disciples practiced. The sect, never very large, steadily declined in numbers after the beginning of the nineteenth century. It has been strongest in America at Danbury, Conn.

SANDERLING. A common grayish snipe (*Calidris arenaria*) remarkable for having only three toes. It is common on the coasts of North America and along the shores of large inland bodies of water, in small flocks in spring and fall. It is sometimes called 'surf-snipe,' and in spring, when the plumage acquires a reddish tinge with black markings, it is locally known as 'ruddy plover.'

SANDERS, zän'dērs, DANIEL (1819-97). A German lexicographer, born in Altstrelitz, and educated at Berlin and Halle. From 1843 to 1852 he was rector of a school in his native town, and then devoted himself to grammar and lexicography. From 1887 to his death he edited the *Zeitschrift für deutsche Sprache*. He took a special interest in modern Greek. His *Wörterbuch der deutschen Sprache* (1859-65) is a standard work. He also published *Wörterbuch der Hauptschwierigkeiten in der deutschen Sprache* (1872), and, besides some volumes of poetry, many works bearing on German grammar, orthography, etc. (1871-82).

SANDERS, JAN. The real name of the Dutch painter Jan van Hemessen (q.v.).

SANDERS, NICHOLAS (c.1527-81). An English Roman Catholic controversialist and historian, born in Charlwood, Surrey, and educated at Winchester College and at New College, Oxford, of which he became fellow in 1548, and professor of common law. He was professor of theology at Louvain until 1572, and then went to Spain, where he urged the Catholic conquest of England. In 1579 he was sent to Ireland as Papal nuncio to rouse rebellion against Elizabeth. Sanders's *De Visibili Monarchia Ecclesiæ* (1571) is a Catholic Foxe's *Martyrs*, and his *De Origine ac Progressu Schismatis Anglicani* (1585; Eng. version by Lewis, 1877), though it won for him the name of 'Dr. Slanders' in England at the time, is not lacking in historical value.

SAN'DERSON, JOHN (1783-1844). An American classical scholar and miscellaneous writer. He was born near Carlisle, Pa. Educated privately, he taught, went to Europe (1835), and on his return became professor of Latin and Greek in the Philadelphia High School. He published with his brother, James H. Sanderson, the first two volumes out of seven of the *Biography of the Signers of the Declaration of Independence* (completed by other hands, reëdited 1865), and was also author of *Sketches of Paris* (1838).

SANDERSON, ROBERT (1587-1663). An English bishop. He was born in Sheffield, educated at Lincoln College, Oxford; ordained in 1611; was rector of Wyberton (1618) and of Boothby Paynel from 1619 for over forty years; prebendary of Lincoln in 1629. Upon the recommendation of Laud he became in 1631 chaplain to Charles I., who in 1642 appointed him regius professor of divinity at Oxford; he was ousted by Parliament in 1648. At the Restoration he was reinstated (1660) and the same year consecrated Bishop of Lincoln; was moderator at the Savoy conference between the Episcopal and Presbyterian divines (1661). He published *Logicæ Artis Compendium* (1618); *De Juramento* (1655); *De Obligatione Conscientiæ Prælectiones* (1660). His works were republished (Oxford, 1854), with a *Life* by Izaak Walton. As a moral theologian his influence in the Church of England was considerable.

SANDERSON, SIBYL (1865-1903). An American operatic singer, born at Sacramento, Cal. She studied singing in France and made her début at The Hague in 1888. In 1889 she ap-

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peared at the Opéra Comique in Paris. In 1895 she returned to the United States and sang with success in French and Italian opera. Her reputation was established in France by her rendering of important rôles in Massenet's operas. In 1897 she married Antonio Terry, and upon his death, two years later, she took up her residence in Paris. Her voice was a soprano of great flexibility and purity of tone. She died in Paris.

SANDES, sänds, ELOISE (1850—). The founder of soldiers' homes in Ireland and India. She was born near the city of Tralee, County Kerry, Ireland, and at an early age evinced her practical sympathy for the military garrisons in Ireland. Beginning with her own home, which she placed at the disposal of the rank and file of the Tralee garrison, she was led to invest her own income in the building of a home in Cork, which became so successful that funds were readily obtainable to carry on the work. In 1903 there were nearly twenty such institutions under the care of Miss Sandes, in Ireland and India.

SANDFORD AND MERTON. A story by Thomas Day (1783-89). It is didactic and had great popularity for many years.

SAND-GROUSE. A game bird of the family Pteroclidæ, related more nearly to the pigeons than to the grouse. There are rather more than sixteen species, chiefly African, but five are Asiatic and two of these occur also in Europe. They are in all important respects terrestrial pigeons, modified for a grouse-like life. The genus Syrrhaptes contains the three-toed forms, of which there are two species. They have the feet feathered. The tail is long and pointed, the middle feathers filamentous and long-exserted. Both species occur in Asia, but occasionally migrate into Europe, even as far as England, in great numbers. The genus Pterocles contains the four-toed forms, of which the best known is the common or 'banded' sand-grouse (*Pterocles arenaria*), abundant in Southeastern Europe. Another species (*Pterocles alchata*) also occurs in Europe and is sometimes called ganga, a name occasionally extended to the whole family. Consult: Morris, *British Game Birds* (London, 1891); Bryden, *Nature and Sport in South Africa* (London, 1897); Elliot, "A Study of the Pteroclidæ," in *Proceedings of the Zoölogical Society of London* (London, 1878). See Plate of PARTRIDGES, ETC.

SAND'HAM, HENRY, (1842—). A Canadian historical and portrait painter, born in Montreal. He studied under J. A. Fraser in his native city, then studied abroad, and settled in Boston in 1880. His works include "Battle of Lexington," "March of Time," and "Founding of Maryland," and a portrait of Sir John Macdonald. He was elected a member of the Royal Canadian Academy of Art in 1880. His illustrations are also well known.

SAND-HILL CRANE. A very large species of crane (*Grus Mexicana*) found in the Mississippi Valley and southeastward to Georgia and Florida. It is a shy bird, with acute sight and hearing. Its body is about four feet long. The name is extended to other cranes, and is also erroneously given in some places to the great blue heron. See CRANE.

SANDHOPPER. An amphipod crustacean. These so abound on sandy shores that often the whole surface of the sand seems to be alive with the multitudes which, leaping up for a few inches into the air, fill it like a swarm of dancing flies. They may also be found by digging in the sand, in which they burrow. Sandhoppers leap by bending the body together and throwing it open with a sudden jerk. They feed on almost any vegetable or animal substance, particularly on what is already dead and beginning to decay. They are themselves the food of crabs, and of many kinds of birds. See AMPHIPODA.

SAND'HURST ROYAL MILITARY COLLEGE. The preparatory college for military cadets of the British Army, corresponding to the United States Military Academy (q.v.) at West Point. It is situated at Sandhurst, Berkshire, 33 miles west-southwest of London. Admission to the college is by open competition through examinations which are conducted each half year, under the direction of the Civil Service Commission. See MILITARY EDUCATION.

SAN DIEGO, sän dē-ā'gō. A port of entry and the county-seat of San Diego County, Cal., 125 miles south by east of Los Angeles, on San Diego Bay, and on the Atchison, Topeka and Santa Fe Railroad, and several steamship lines (Map: California, E 5). San Diego Bay forms a superb land-locked harbor, 22 square miles in area. The Navy and the War Department have separately large tracts of land on the bay, for a coaling station and fortifications respectively, the latter known as Fort Rosecrans. A health resort of some prominence, San Diego is favored by a beautiful situation and a mild equable climate. It is the seat of a State Normal School, and has the Academy of Our Lady of Peace, a Carnegie public library, the Hospital of the Good Samaritan, and a fine court-house. Fort Stockton and the old Spanish mission are other noteworthy features. Coronado Beach, across the bay, with the large Hotel del Coronado, an ostrich farm, botanical gardens, and other attractions, is a popular resort. San Diego has considerable commercial importance as the centre of extensive lemon and other fruit interests and as a port of entry. The value of the foreign trade in 1901 was $1,475,000, including exports to the amount of $963,000. The industrial establishments of the city in the census year 1900 had an invested capital of $1,147,712, and an output valued at $1,309,321. The principal manufactured products are carriages and wagons, flour, furniture, fertilizers, show cases, vinegar, wine, citric acid, oil of lemon, of orange, etc. The government, under the revised charter of 1901, is vested in a mayor, chosen every two years, a bicameral council, and in administrative officials. Population, in 1890, 16,159; in 1900, 17,700. In 1769 the first California mission was established here, and in 1835 the 'pueblo' was organized, San Diego thus being the oldest municipality in the State. In 1846 Commodore Stockton took possession of the place for the United States, and established a fort which is still known as Fort Stockton. The growth of the present city dates from 1867. The charter now in operation was granted in 1889. Consult: Gunn, *San Diego, Climate, Productions, Resources, Topography* (San Diego, 1887); Wood, *Home-land, being a brief description of the city and county of San Diego* (ib., 1901).

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SAN DIEGO BARRACKS (California). A United States military post in the city of San Diego. It has quarters for two companies of artillery.

SAN DIEGO DE LOS BAÑOS, dä lôs bä'nyôs. A celebrated health resort of Cuba, in the Province of Pinar del Rio, among the mountains 22 miles northeast of Pinar del Rio (Map: Cuba, B 4). There are sulphurous springs and baths. Population, in 1899, 2419.

SAN DOMINGO. See SANTO DOMINGO.

SANDPAPER. An abrading material made by coating paper, or less often cloth, with glue and then covering it with sand. Other polishing materials made in a similar manner are *emery paper* and *glass paper*. Sandpaper is intermediate between glass paper and emery paper in its action on metals, and less effective than glass paper on wood. *Steel wool* is a substitute for sandpaper, whose chief advantage is its greater pliability, enabling a worker to polish or smooth down irregular parts of moldings or ornamental woodwork.

SAND-PIKE. One of the local names of the sauger (q.v.), especially heard in the Great Lakes region, where this gray fish spends its time mainly over sandy bottom.

SANDPIPER (so called from its notes and habit of running along the sand). Any one of a numerous group of shore-birds, of the family Scolopacidæ, arranged in a large number of genera. They are not of large size, rarely over one foot in length; are very active and graceful in all their movements; their plumage not gay, but of pleasing and finely diversified shades of buff, brown, gray, white, and black; their legs are rather long, the lower part of the tibia naked, the tail very short, the wings moderately long; the bill rather long and slender, grooved throughout the whole or a considerable part of its length, straight in some, and a little arched in others. The feet have three long toes before and one short toe behind; the front toes are sometimes partly webbed and sometimes cleft to the base; in the sanderling (q.v.) there are only three toes. They are good swimmers, but are not, however, often seen swimming; they frequent sandy shores, some of them congregating in numerous flocks in autumn and winter; and seek their food by probing the sand with their bills, and by catching small crustaceans in pools or within the margin of the water itself. Many are birds of passage, visiting high northern latitudes in summer, and spending the winter on the coasts of more southern regions. The flesh of all the species is good, and some of them are in much request for the table. The sandpipers all build very simple nests on the ground, sometimes in exposed places. The eggs are usually 3 or 4, pyriform, drab, olive, or buff, heavily spotted with dark brown. They are placed in the nest with the small end at the centre. About twenty species occur in North America, of which the following are the most important: The stilt sandpiper (*Micropalma himantopus*) is about nine inches long; in the plumage in which it is seen in the United States, it is brownish-gray, with white tail, upper tail-coverts, and under parts. It breeds in the Arctic regions and passes through the United States during the migrations. The knot (q.v.) is a somewhat larger species, while the 'peep' is decidedly smaller, and the stint (q.v.) is also very small. The pectoral sandpiper, or 'fat-bird,' or 'grass-snipe,' is a very widely distributed bird, nine inches long, black and buff above, which breeds only in the extreme north. Closely allied to this species, but smaller and with white upper tail-coverts, is the white-rumped sandpiper (*Tringa fuscicollis*). The red-backed sandpiper is the American representative of the dunlin (q.v.). The purple sandpiper (*Tringa maritima*) is a beautiful purplish species, eminently boreal and shy in its habits, and rare except along the Atlantic coast, where it is commonly called 'rock-snipe.' Among the largest sandpipers are the yellowlegs (q.v.) and the solitary sandpiper. These represent the genus Totanus. The Bartramian sandpiper, or 'upland plover' (*Bartramia longicauda*), is common throughout Eastern North America, but is a shy bird, frequenting open fields and pastures. The commonest and best known species of this group in the Eastern United States is the spotted sandpiper or 'tip-up' (*Actitis macularia*). It is over seven inches long, green-gray above and white below, marked and spotted with black. It is not uncommon about bodies of fresh water and breeds throughout its range, which includes all of North America. Consult general works on ornithology and shooting; especially Elliot, *North American Shore Birds* (New York, 1898); Coues, *Birds of the Northwest* (Washington, 1874); Hudson, *The Naturalist in La Plata* (London, 1892); Aflalo, *Sport in Europe* (ib., 1901). See Colored Plates of SHORE-BIRDS; EGGS OF WATER AND GAME BIRDS; Plate of BEACH BIRDS.

SANDPIPES. Cylindrical tubes descending perpendicularly into the ground, especially in chalk formations, and filled with sand, clay, or gravel. These tubes taper downward, ending in a point, and most probably have been produced by the solvent action of rain water as it drains downward through the soil.

SANDRART, zän'drärt, JOACHIM VON (1606-88). A German painter, engraver and art-historian, born at Frankfort-on-the-Main. He studied at various times under Merian, Sadeler, and at Utrecht under Honthorst, whom he accompanied to England. In 1627 he went to Italy, where his portraits became so celebrated that he was commissioned to paint several for Pope Urban VIII. He returned to Germany in 1635, settled two years later at Amsterdam, and in 1641 on his estate near Ingolstadt. Afterwards he established himself at Nuremberg, where his best-known work, "The Peace-Banquet in 1649," containing fifty portraits, may be seen in the Rathaus. Of greater importance than his paintings are his writings, especially *Die deutsche Akademie der edlen Bau-, Bild- und Malereikünste* (1675-79), revised by Volkmann (1768-75), critical ed. by Sponsel (1896).

SAND-RAT. A small burrowing rodent of the mole-rat family (Bathyergidæ), of which about ten species occur in Africa of the genus Georychus. The name specifically applies to a species in Cape Colony (*Georychus Capensis*).

SANDRINGHAM, sän'drĭng-am. An estate of 7000 acres near Lynn, in Norfolk, which was the favorite residence of King Edward VII., as Prince of Wales. It was bought in 1862, and the present brick mansion, in the Elizabethan style, was built about 1870.

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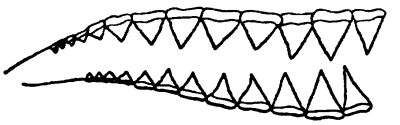
SAN'DROCOT'TUS (Lat., from Gk. Σανδρόκοττος, *Sandrokottos*, from Skt. *Candragupta*, moon-protected). A Hindu king, probably a native of the Punjab. For some unknown reason he left his home and remained for several years in the service of Chandrames or Nandrus, King of Magadha (q.v.). In some way he offended Chandrames and returned to the Punjab. Here, after the murder of Porus (q.v.) by Eudemus, about B.C. 317, Sandrocottus took advantage of the racial hatred felt by the Hindus for the Greeks, which had been increased by the assassination, and headed a revolt during the enforced absence of Eudemus. The rebellion was completely successful, and Sandrocottus made himself master of the Punjab. He then invaded Magadha, which he conquered with ease, and established his capital at Pataliputra (q.v.). Here, in B.C. 315, he founded the Maurya dynasty, which ruled until B.C. 178. About B.C. 305 Seleucus Nicator (see SELEUCIDÆ) invaded India to recover the territories which the Greeks had lost there. Details of this inroad are lost, but it is known that Seleucus ceded to Sandrocottus Gedrosia and Arachosia, as well as the Paropamisus and the lands on the west bank of the Indus, in return for five hundred elephants. The treaty was strengthened by the marriage of a daughter of Seleucus to the Indian King. This alliance had a result important for a knowledge of India in the fourth century before Christ, for Seleucus sent as an ambassador to the Court of Sandrocottus the historian Megasthenes (q.v.), the fragments of whose *India* contain the earliest non-Hindu information concerning the country. As the grandfather of Aśoka (q.v.) Sandrocottus is frequently mentioned in Buddhistic literature. It is noteworthy that Sandrocottus is the hero of the single historical drama of India, the *Mudrārākṣasa* of Viśakhadatta (q.v.). Consult McCrindle, *Invasion of India by Alexander the Great* (2d ed., Westminster, 1896).

SAND-ROLLER. See TROUT-PERCH.

SANDS, HENRY BERTON (1830-88). An eminent American surgeon, born in New York City and graduated from the College of Physicians and Surgeons in 1854. He was demonstrator of anatomy in his *alma mater*, 1856-66; professor of anatomy, 1867-79; and professor of surgery, 1879-88. He began to practice his profession in New York City in 1856, and was associated with the noted surgeon Dr. Willard Parker (q.v.) from 1860 to 1870. He was an occasional contributor to medical journals, but was best known as a teacher and a skillful surgeon. The part he played, shortly before his death, in the discussion of 'typhlitis' and 'perityphlitis,' led the way to the discovery of appendicitis and the coining of that word. Among his published works, contributed to medical journals, are essays on amaurosis, bony ankylosis, Esmarch's bloodless method, gleet, tracheotomy, intussusception, stricture of the urethra, rupture of veins, and septic peritonitis. Consult his biography in *Medical Record*, xxxiv. (New York, 1888).

SANDS, ROBERT CHARLES (1799-1832). An American poet and miscellaneous writer. He was born in Flatbush, Long Island, graduated at Columbia in 1815, and studied law. He contributed essays to various journals and wrote, with his friend J. W. Eastburn, an epic of King Philip's War, *Yamoyden* (1820). Though admitted to the bar, he devoted himself to literature, editing several short-lived magazines and, till his death, the *Commercial Advertiser*. He collaborated with Bryant and Verplanck in an Annual, *The Talisman* (1828-30), and *Tales from the Glauber Spa* (1832), and wrote *Life and Correspondence of Paul Jones* (1831). His *Works* were collected by Gulian C. Verplanck with a *Memoir* (2 vols., 1834).

SAND-SHARK. One of the small voracious sharks of the family Carchariidæ, which have very sharp, triangular, and finely serrated teeth.



TEETH OF SAND-SHARK.

These sharks are of moderate size, chiefly inhabit the Atlantic Ocean, and one species (*Carcharias littoralis*), gray in color, and about five feet long, is common off the eastern coast of the United States.

SAND-SMELT. The British name for the fishes of the widely distributed family Atherinidæ, allied to the barracudas and mullets, the American species of which are known in general as 'silversides' (q.v.). Two species occur in Great Britain, swarming in the creeks and estuaries along the coast, and are netted in great numbers in spring, when spawning, and when they make an excellent pan-fish. The most numerous one is *Atherina hepsetus*, about six inches long, and marked by a broad silvery stripe along the side. The resemblance of certain related species on our Pacific coast, especially *Atherinops Californiensis*, has led to its being called 'smelt' there.

SAND-SNAKE. A small snake of the boa family and genus Eryx, of which several species inhabit the Sahara and deserts to the eastward. They have no apparent neck, a blunt tail; are variegated in dull tints; creep about, half-buried in sand, or explore holes in rocks; hunt at night for insects and small animals; and are often carried about by snake jugglers, who mutilate the tail to give the snake the appearance of having two heads.

SANDSTONE. A stratified rock composed of grains of sand. The grains are mostly quartz, but other minerals, such as mica, feldspar, hornblende, and pyroxene, may be present. With an increase or decrease in the size of the grains, sandstones pass into conglomerates on the one hand, and into shales on the other, and by an increase in the percentage of lime carbonate they may also grade into limestones. Sandstones containing little cementing material between the grains are soft, and occupy a mean position between consolidated sandstone and loose sands; those with much cementing material are very hard. The cement, which may be either lime carbonate, iron oxide, or silica, influences the crushing strength of sandstones, the last named material giving the greatest hardness. The color is usually traceable to the presence of iron or carbonaceous matter, and is commonly brown, yellow, red, gray, or white. Sandstones are widely distributed geographically, and also

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geologically. It may be said in general that those found in the older formations are harder than those occurring in the younger series. A number of different varieties of sandstone have been recognized, among which the following may be mentioned: *Quartzite.*—A sandstone which has become hardened and sometimes more highly silicified by metamorphism. *Arkose.*—A highly feldspathic sandstone. *Freestone.*—A name applied by quarrymen to many sandstones on account of the easy way in which they can be dressed, or cut. *Brownstone.*—A name formerly applied to certain reddish brown sandstones found in the East, but now applied to sandstones of other colors coming from the same locality as the original brownstones. *Flagstone.*—A hard, thinly bedded, shaly sandstone used for pavements. *Bluestone.*—A kind of flagstone quarried largely in southeastern New York. *Novaculite.*—An extremely fine-grained siliceous rock found in Arkansas. The most important use of sandstone is as a building material, for which it is admirably adapted by reason of its durability and the ease with which it can be wrought. Certain varieties are specially favored for structural purposes; in the Eastern United States the Triassic brownstones of the Connecticut Valley, the Berea sandstone of Ohio, the Medina sandstone, and the Potsdam quartzite of New York have been most extensively quarried. Varieties that are nearly free from iron oxide and clay are much sought after for use in glass manufacture and pottery-making. Certain beds of the Berea sandstone of Ohio are of value for grindstones, and the novaculite of Arkansas is highly prized for making oilstones.

The value of sandstone for building purposes produced in the United States in 1901 was $6,974,199, and the output of bluestone was valued at $1,164,481.

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SANDSUCKER, or CALIFORNIA WHITING. A dusky gray fish (*Menticirrhus undulatus*) related to the Eastern kingfish, and common along the sandy coasts of southern California, where it is a food-fish of some importance. It receives its name from an erroneous popular belief that it feeds on sand.

SANDUS'KY. A port of entry, and the county-seat of Erie County, Ohio, 53 miles south by east of Toledo; on Sandusky Bay, and on the Lake Shore and Michigan Southern, the Baltimore and Ohio, the Lake Erie and Western, and the Cleveland, Cincinnati, Chicago and Saint Louis railroads (Map: Ohio, E 3). It is finely situated, and has a spacious harbor. Cedar Point, a short distance from Sandusky, is an attractive summer resort. The State Fish Hatchery, public library, Soldiers' Home, the courthouse, and Federal building are noteworthy features. Excellent transportation facilities have made Sandusky of considerable commercial importance. A large trade is carried on in coal, fruit, stone, lime, and lumber, and there are also extensive fish and ice interests. The industrial establishments in the census year 1900 had an invested capital of $4,627,981, and an output valued at $3,190,342. Tools, chemicals, agricultural implements, lumber products, engines, dynamos, glass, and cement are the principal manufactures. Ship-building is another important industry. The government, under the general charter of 1902, is vested in a mayor, council, and president. Sandusky was settled in 1817 and was incorporated as a city in 1845. On May 16, 1763, Fort Sandusky here was treacherously captured by the Indians, and all the garrison except the commander, Ensign Paully, massacred. Near by in 1782 a force of 480 men under Colonels Williamson and Crawford was defeated by a larger Indian force. Population, in 1890, 18,471; in 1900, 19,664.

SAND-WASP. A wasp which makes its nest in a burrow in the soil, preferably where sandy, and provisions cells in which its eggs are placed. (See DIGGER-WASP.) The most prominent species is the great yellow sphecius, which stores cicadas in its burrows and hence is called 'cicada-killer.'

SAND'WICH (village on the sands). A town of Kent, England, one of the Cinque Ports, on the Stour, 11 miles north of Dover (Map: England, H 5). It is rectangular. The houses, which seem crushed together, and the architecture of which recalls the Plantagenet period, are strikingly antique in appearance. The Church of Saint Clement's, with a low Norman tower, is probably the most interesting edifice. The town owns a guild hall, three ancient hospitals, etc. The port admits small vessels of 12 feet draught. The most ancient of the Cinque Ports (q.v.), it occupies the site of the Roman *Rutupiæ*. At the commencement of the eleventh century, it was the most famous of all the English ports. It was incorporated by Edward III. Within the last 800 years the sea has gradually receded until Sandwich is now two miles from the shore. Population, in 1901, 3174. Consult Burrows, *Cinque Ports* (London, 1883).

SANDWICH, EDWARD MONTAGU, Earl of (1625-72). An English admiral, son of Sir Sidney Montagu, a Royalist, but himself in his early youth a Parliamentarian. He raised a regiment when eighteen, fought at Marston Moor in 1644, and in 1645 at Naseby. In 1656, thanks to his friendship with Cromwell, he was appointed Blake's colleague. Deprived of all commands save that of admiral, after the fall of Richard Cromwell, Montagu joined the party in favor of the Restoration. His intrigues at this time, and especially his friction with General Monk, are vividly sketched in the diary of his secretary, Samuel Pepys. On the return of Charles II. Montagu became Earl of Sandwich, and was intrusted with negotiations for the King's marriage with Catharine of Braganza and for the cession of Tangiers to England. He won the victory of Lowestoft over the Dutch in 1665, and was promoted to be commander-in-chief, from which post he was soon retired because of his permitting the illegal distribution of prize money by his own officers. But his popularity was largely regained by his successful conclusion of the treaty with Spain in 1668. In 1672, as second in command to the Duke of York, he was defeated by Ruyter off Solebay; his flagship blew up and he was killed. He is best known by Pepys's admiring and minute portrayal.

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SANDWICH, JOHN MONTAGU, Earl of (1718-92). An English politician, notorious for his political and personal vices. He succeeded to the title at the age of eleven, studied at Eton and at Trinity, Cambridge; and after two years on the Continent entered politics, becoming a lord of admiralty. In 1748 he became First Lord of the Admiralty, and attempted to reform naval administration. Sandwich first earned the ill opinion of the people by turning on John Wilkes, an old friend and companion in his infamous ribaldry, partly for political reasons. He augmented this unpopularity by his management from 1771 to 1782 of the Admiralty, of which he was again First Lord, purely for party purposes, and by his keeping for years as mistress Miss Martha Ray, who was shot in 1779 by the Rev. James Hackman, an unsuccessful lover, and whose murder revealed the story of her life. After the fall of North's Cabinet in 1782 Sandwich did not return to public life. Awkward and uncouth as he was and the worst hated man of his time, he was yet a man of singular personal charm and was much admired and loved by his departmental inferiors. In the annals of anecdote the Earl figures as inventor of the 'sandwich.'

SANDWICH ISLANDS. The former name of the Hawaiian Islands (q.v.).

SANDY HILL. A village in Washington County, N. Y., 40 miles north of Troy; on the Hudson River, and on the Delaware and Hudson Railroad. It is an important lumbering and stone-quarrying centre, and is engaged also in the manufacture of foundry and machine-shop products and paper, and in the printing of wall paper. Population, in 1890, 2895; in 1900, 4473.

SANDY HOOK. A low, narrow, sandy peninsula, or spit, running about six miles northward from the coast of New Jersey, partly inclosing Lower New York Bay (Map: New Jersey, E 3). Near its northern end are Fort Hancock, the United States heavy ordnance proving grounds, and a lighthouse 90 feet high.

SANDYS, săn'dĭs *or* săndz, EDWIN (c.1516-88). An English archbishop, born at Hawkshead, Lancashire. He graduated at Saint John's College, Cambridge, in 1541, became prebendary of Peterborough in 1549, and of Carlisle in 1552, and was appointed vice-chancellor of Cambridge in 1553. He was favorable to the Reformation, and, having preached in favor of Lady Jane Grey, was imprisoned in the Tower, from which he escaped and fled to the Continent in 1554. He returned to England on the day of Elizabeth's coronation; was made Bishop of Worcester in 1559; of London in 1570; and Archbishop of York in 1576. He was a translator of the Bishop's Bible, and a commissioner to revise the liturgy. His *Sermons, with Miscellaneous Pieces and Biographical Notice* by the Rev. John Ayre, were published at Cambridge in 1841.

SANDYS, Sir EDWIN (1561-1629). An English statesman. The second son of Archbishop Sandys, he was born in Worcestershire, and was educated at Corpus Christi College, Oxford, where he was a pupil of Richard Hooker, graduating in 1589. In 1599 he joined James VI. in Scotland, by whom, as James I., he was knighted. He was a leading member of the House of Commons, and was a member and treasurer of the second Virginia Company. It was largely due to his efforts that a charter was obtained for the Plymouth Colony.

SANDYS, FREDERICK (1832-1904). An English painter and draughtsman, born in Norwich. He studied with his father, was associated with the Pre-Raphaelite group, and became one of the most promising of the school. He caricatured Millais's "Sir Isumbras at the Ford" under the title "A Nightmare" (1857), and introduced portraits of Millais, Ruskin, Rossetti, and Hunt into the sketch, which attracted much attention. Much of Sandys's best work was in the form of woodcuts. His subjects were usually taken from Scandinavian mythology or mediæval legends; his draughtsmanship is fine, and his conception original. His paintings in oil, exhibited during the sixties, are few, but of the highest order. They include: "Medea" (1869), "Oriana," "The Valkyrie," and "Morgan le Fay" (1864).

SANDYS, GEORGE (1577-1644). An English traveler and poet. The seventh son of Archbishop Sandys, he was born at Bishopsthorpe, Yorkshire, and was educated at Saint Mary Hall, Oxford. In 1621, succeeding his brother as treasurer of Virginia, he went to America and interested himself in the welfare of the colony, establishing iron works and introducing ship-building. He published translations of Ovid's *Metamorphoses* (1626), the first translation of a classic made in America; also poetical versions of the *Psalms* (1636); of *Job, Ecclesiastes,* and *Lamentations* (1639); and *Christ's Passion: A Tragedy* (1640), translated from the Latin of Hugo Grotius. Consult Hooper, *The Poetical Works of George Sandys, With an Introduction and Notes* (London, 1872).

SANDYS, JOHN EDWIN (1844—). An English classical scholar. He was educated at Repton School, and at Saint John's College, Cambridge. In 1870 he obtained his M.A. and was appointed tutor of Saint John's. From 1867 to 1877 he was classical lecturer at Jesus College, and in 1876 he became public orator of the University of Cambridge. Besides his many contributions to the *Classical Review* and his history of classical scholarship in Traill's *Social England,* he published editions of Demosthenes, the *Bacchæ* of Euripides (1880), Cicero's *Orator* (1885), and Aristotle's *Constitution of Athens* (1893). In 1886 he published *An Easter Vacation in Greece.*

SAN FELIPE, fä-lē'pä. The capital of the Province of Aconcagua, Chile, situated 40 miles northeast of Valparaiso, and near the base of Aconcagua (Map: Chile, C 10). It is surrounded by parks. It manufactures cordage, and has considerable trade with Argentina, being a station on the Trans-Andean Railroad. Population, in 1895, 11,313.

SAN FELIPE. The capital of the State of Yaracuy, Venezuela, 120 miles west of Carácas. Cacao, coffee, sugar, fruits, tobacco, grain, and brandies are produced. The town was founded in 1552 and destroyed by an earthquake in 1812. Its population is about 5000.

SAN FELIPE DE JÁTIVA, hä'tē-vä. See JÁTIVA.

SAN FELÍU DE GUIXOLS, sän fä-lē'ōō dä gē-hōls'. A town of Northeastern Spain, in the Province of Gerona, on the Mediterranean coast, 50 miles northeast of Barcelona. It manufac-

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tures corks, which are exported in large quantities. The salting of fish is also important. There is a harbor with considerable shipping. Population, in 1900, 11,253.

SAN FERNANDO, fĕr-nän'dō (formerly ISLA DE LEON). A town of Southwestern Spain, in the Province of Cadiz, on the island of Leon, near the inner Bay of Cadiz, seven miles southeast of the city of that name (Map: Spain, B 4). It is a handsome town, but is surrounded by salt marshes. The principal public building, the Casa Consistorial, is one of the finest of its kind in Spain. There is an important naval academy, and outside the city stands a large and well-equipped astronomical observatory. The industries are represented by salt works, flour mills, an iron foundry, and manufactures of cordage and sails. A mile to the north lies the port of La Carraca, with wharves, docks, and an arsenal. Population, in 1887, 29,287; in 1900, 29,802.

SAN FERNANDO. The capital of the Province of Colchagua, Chile, 86 miles south of Santiago, with which it has railway connection (Map: Chile, C 10). Its population in 1895 was 7477.

SAN FERNANDO. A town of Cebū, Philippine Islands, situated on the east coast 15 miles southwest of Cebū (Map: Philippine Islands, H 9). Population, estimated, in 1899, 12,155.

SAN FERNANDO. The capital of the Province of La Unión, in Luzon, Philippines. It is situated at the entrance to the Gulf of Lingayén on the highroad and projected railroad between Manila and Laoag (Map: Philippine Islands, E 3). It has a harbor protected by a small peninsula. Population, estimated, in 1899, 12,892.

SAN FERNANDO. A town of Luzon, Philippine Islands, in the Province of Pampanga (Map: Philippine Islands, E 4). It is situated about four miles northeast of Bacolor, has a telegraph station and is a station on the Manila-Dagupan Railroad. It is an important centre of the sugar industry, and has several sugar mills and large store-houses. Population, estimated, in 1899, 13,266.

SAN'FORD. A town in York County, Maine, 36 miles southwest of Portland; on the Boston and Maine Railroad (Map: Maine, B 9). It is an industrial centre, its manufactures including shoes, plush, blankets, carriage robes, worsted cloth, yarn, and lumber products. Settled about 1740, Sanford was first incorporated in 1768. Population, in 1890, 4201; in 1900, 6078. Consult Emery, *The History of Sanford, Maine, 1661-1900* (Fall River, 1901).

SAN·FRANCIS'CO. (The description contained in this article deals with the city prior to the earthquake of April 18, 1906. For the description of the destruction due to that disaster see SAN FRANCISCO EARTHQUAKE and the accompanying illustrations.) The metropolis of the Pacific Coast of the United States and the largest and most important city of the region west of the Missouri River. It is built on a peninsula washed by the waters of the Pacific Ocean on one side and the Bay of San Francisco on the other, and occupies a central position on the coast line of California.

DESCRIPTION. The city's land area is 47 square miles. Its site is largely hilly, and it presents a picturesque appearance from the harbor. The part devoted to commerce lies along the shores of the bay, and is moderately level, but the residential districts are on elevated ground. The most fashionable quarters are those which overlook the ocean, bay, and town. 'Nob Hill,' upon which the men who constructed the first overland railroad built their palatial homes, is about 300 feet above the level of the ocean, and 'Pacific Heights' rise still higher. The 'Twin Peaks,' which form a background to the leading thoroughfare, are 900 feet high.

A part of the site of San Francisco is reclaimed from the bay. Some of the most substantial structures in the business section are reared on piles driven to bed rock through made ground, and vast areas of sand dunes have been leveled in order to conform localities to the street system, which was arbitrarily decided upon with little reference to contour. Market Street, a thoroughfare several miles long, and the streets south of it, are level, but those from the north and west intersecting it strike boldly at the hills and have gradients in some cases as great as 50 per cent. It is this feature which gives the town its striking sky line. From the bay it presents the appearance of a city with houses piled on top of one another, while from the points of vantage offered by the hills, views of rare beauty, embracing the ocean, the bay with its islands and active commerce, the densely populated districts, and the distant mountains, may be obtained.

Its situation on a peninsula across which the summer trade winds blow has given San Francisco a unique climate. During thirty years of observation, the lowest temperature recorded was 29° F., and the highest 100°. The lowest mean temperature for any month during this period was 46°, and the highest, 65°. The mean temperature was lowest in December, when it averaged 50°, and highest in September, reaching 63°. Semi-tropical plants flourish in the open air throughout the winter. During the summer months rain rarely falls, but the skies over the city are frequently clouded with fog, which sometimes descends in the form of a mist. The rainfall averages about 21 inches. The precipitation usually begins in October and ceases in May. The term "rainy season" applied to weather conditions in central and southern California simply means that there are certain months during which rain falls, and not that there is continuous rain. A prominent feature of the climate is the regular afternoon wind.

Except the thoroughfares in a very small area near the water front, in the oldest part of the city, the streets are of ample width. Market street, the main artery, starts at the Ferry Building and cuts across the town in a southwesterly direction. It is intersected on the north side by streets laid out in conformity with the cardinal points. This arrangement produces irregular blocks at the points of intersection, which have left some space for placing monuments. The streets south of Market, with the exception of Mission, which describes a lengthened arc, cut each other at right angles. The sidewalks are wide in all parts of the city and are generally constructed of artificial stone. There are in all 750 miles of streets open to travel. Of these 104 miles are paved with bituminous rock laid on a foundation of concrete; there is a large proportion, however, paved with blocks of basaltic rock laid in sand, and in some neglected quarters cobbles still remain.

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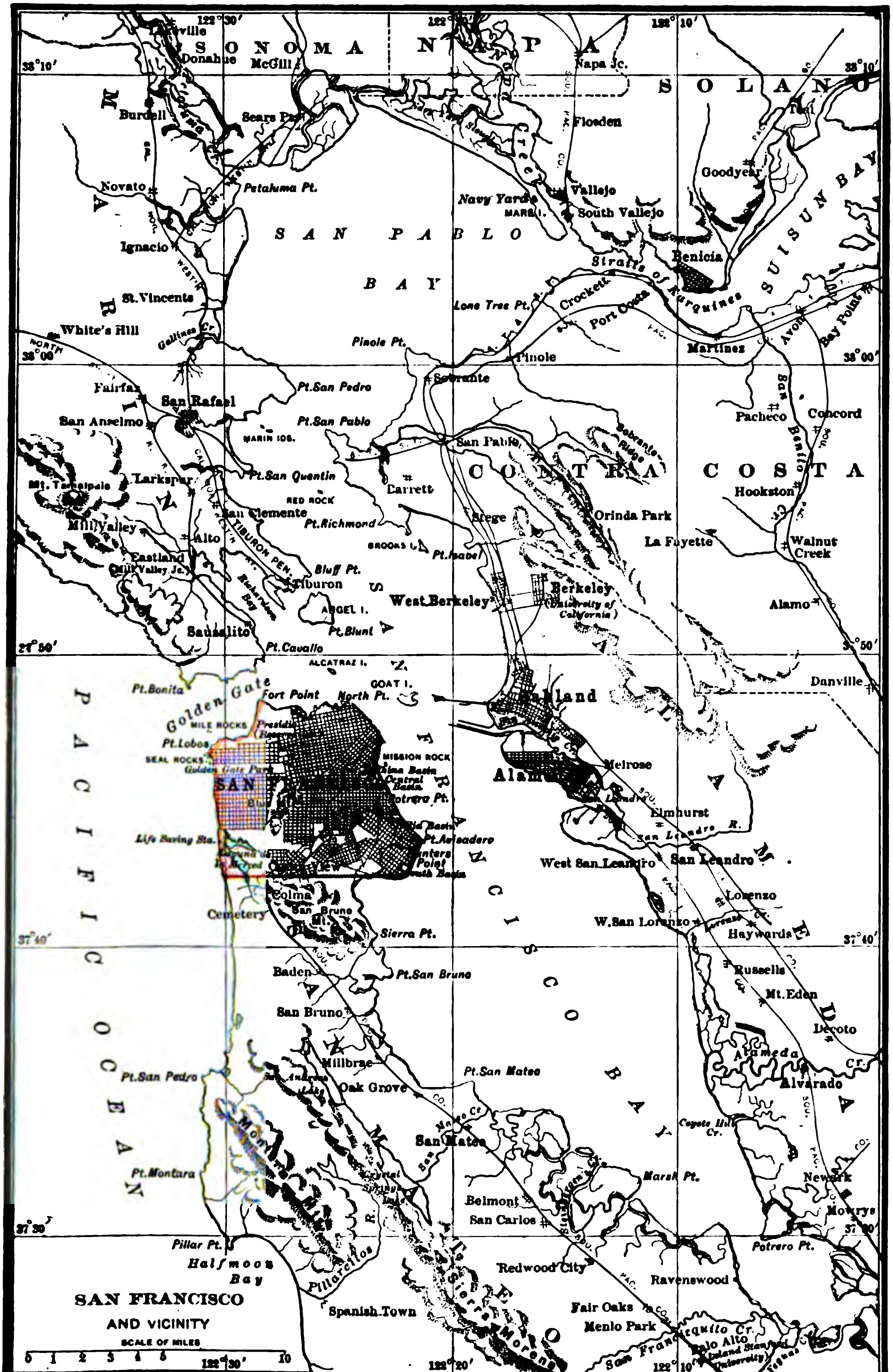

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Market Street is the leading thoroughfare, and at all times presents an animated appearance. Some of the largest department stores in the city are on this street, but the chief shopping district is still in the streets to the north of that thoroughfare—Kearny, Sutter, Post, Geary, and Stockton streets, and Grant Avenue. Union Square, in this locality, is becoming a fashionable shopping centre. An extensive system of boulevards exists, furnishing a continuous drive of nearly 20 miles. It starts near the heart of the city, traverses the United States military reservation and Golden Gate Park, skirts the Pacific Ocean for two or three miles, and winds in and out among the hills lying southwest of the town. In 1903 there were 274.60 miles of street car tracks—176 electric, 86.68 cable, 4 horse, and 8 steam. One corporation controlled 244 miles of this system.

Parks. Golden Gate Park, containing more than 1000 acres, enjoys the distinction of having been redeemed from a sand waste. There are now nearly 300 acres of close-shaved sward, green and attractive all the year round, and a still greater area is planted with shrubs and trees, semi-tropical types being largely predominant. In addition to Golden Gate Park, numerous smaller parks, chiefly four blocks in extent, are scattered throughout the city. These usually contain trees and shrubbery which remain green summer and winter, several varieties of palms being in evidence. The military reservation of the Federal Government, known as the Presidio (q.v.), is practically part of the park system. Its area exceeds that of Golden Gate Park, and it is far more favorably located for cultural purposes.

In Golden Gate Park there are several portrait statues, but none of great merit. The monument by Story to Francis Scott Key, the composer of "The Star-Spangled Banner," is the best. Near the City Hall is an ambitious group of bronzes, which cost $50,000, representing the development of California. There are two noteworthy productions of a local sculptor, Douglas Tilden, on Market Street. One is designed to commemorate the admission of California to the Union, and the other is a vigorous group in bronze typifying the progress of manufactures in the city. Union Square has a lofty column to commemorate the achievements of the navy during the war with Spain.

Buildings and Institutions. The abundance of excellent timber and a popular belief that a frame building is safer and better in a locality having the peculiar conditions of San Francisco are responsible for the fact that in 1900 there were 50,494 frame and only 3881 stone and brick buildings. The tendency to use the more durable materials is, however, growing rapidly. The occasional occurrence of earth tremors for a long time restrained the propensity to build 'skyscrapers.' In 1890, however, the proprietor of the *Chronicle* erected a ten-story modern fireproof building. This example was soon followed by other property-owners, and the city has now its share of tall structures, one of them 18 stories high. The major part of this class of buildings is composed of 8, 10, and 12 storied buildings, the 8-storied being most numerous.

The most conspicuous building is the City Hall, surmounted by a dome 332 feet high. It cost over $6,000,000, and twenty-five years were occupied in building it. It is very solidly constructed, and its walls of brick are covered with cement. Architecturally it is a composite. The interior of the dome is decorated with native marbles. The structure houses all the administrative departments of the city government and several civil courts. The criminal and police courts and the police department occupy a modern building, known as the Hall of Justice. It is constructed of brick and stone and is surmounted by a clock tower. The post-office, completed in 1903, is a substantial structure of granite, costing over $5,000,000. It is not a striking architectural production, but impresses by its massiveness. In addition to the post office, the Federal Government maintains a mint and a sub-treasury.

On the water front the State maintains the Ferry Building, a structure over 800 feet in length, built of a light-colored sandstone and surmounted by a graceful clock tower. Through this building most of the strangers entering the city are obliged to pass. It contains a lofty nave running through its entire length, which is frequently used for exhibiting the products of the State. It also houses a permanent exhibit illustrative of the resources of California, maintained by the State Board of Trade, and a fine Alaskan ethnological collection. A complete display of the mineral resources of California is also made in the Ferry Building by the State Mining Bureau. The Academy of Sciences, endowed by James Lick, is a substantial structure. It holds a growing museum devoted to the natural sciences. In Golden Gate Park is situated the Memorial Museum, founded to commemorate a successful international fair held in 1894. The Hopkins Art Institute, situated on 'Nob Hill,' contains the nucleus of a fine-art collection. The building and contents were presented to the University of California to be maintained for the public. The Public Library contains over 100,000 volumes. At present it is installed in a wing of the city hall, but maintains several branches. In October, 1903, bonds to the amount of $1,600,000 were voted to provide a new building. The cost of maintaining the library is about $65,000 a year. In addition to the Public Library there are seven other libraries of some importance. That of the Mechanics' Institute is the most useful of these, the collection covering the range of the applied sciences. It has more than 70,000 volumes, and property valued at over $2,000,000. The Sutro Library is a heterogeneous collection of over 200,000 volumes. It contains a large number of rare books and manuscripts. The California Historical Society, San Francisco Medical Society, the San Francisco Law Library, the French Library, and the Mercantile all have collections exceeding 30,000 volumes.

None of the churches are conspicuous examples of ecclesiastical architecture. The Roman Catholic Cathedral is a brick structure. The Jesuit Church of Saint Ignatius, with its accompanying college buildings, covers a full city block. The Dominicans have an equally large church. Many of the older church buildings are of frame. The Mission Dolores is a survival from the days of the Spanish occupation. It is built of adobe, and care is taken to preserve it as a landmark, although it has none of the attractive features of many of the churches built by the friars.

There are 47 hospitals, public and private, and many of them are of recent construction. The emergency system has been well developed, and

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few cities are better provided with the means to care for the victims of accidents. Of literary, scientific, and other societies there is an unusual number. Among the most prominent may be mentioned the Academy of Sciences, Astronomical Society, Geographical Society, Mechanics' Institute, Pioneers of California, and Technical Society. There were in 1904, 133 public school buildings, including high schools. The attendance in 1904 reached 46,341. In addition there are numerous private educational institutions. The Roman Catholics maintain a system of parochial schools. The attendance at private schools in 1904 was 20,978.

THEATRES, CLUBS, AND HOTELS. The leading playhouses are the Columbia, the California, the Alcazar, and the Grand Opera House. The Orpheum and Fischer's are devoted to vaudeville. The Tivoli presents opera in some form every night in the year. There are several low-priced theatres, the most conspicuous being the Central and Grauman's.

The clubs are numerous and well housed. The Bohemian, originally founded by artists and literary people, has a world-wide reputation for entertaining noted visitors. Its rooms are crowded with excellent pictures, many of them gifts of artist members. The Pacific Union is composed chiefly of wealthy citizens. The Jews have two prominent organizations—the Concordia and the Verein. The number of women's clubs is large. The leading ones are the Century, Sorosis, Forum, Outdoor Art League, and California. The members of the last two take an active part in civic matters, but the others are devoted chiefly to social and literary work.

There are many hotels of all classes. The most prominent among these are the Palace and the Occidental. The Saint Francis, a modern 12-story building of steel and stone, is admirably situated on Union Square.

SUBURBS. San Francisco, like all large American cities, has felt the influence of easy communication. The multiplication of street railway facilities has caused its population to spread out over the greater part of its area. These transportation conveniences have resulted in reducing the average number of persons in a dwelling to 6.4. The ease with which the trans-bay cities of Oakland, Alameda, Berkeley, San Rafael, Sausalito, and Belvedere are reached has also contributed to that result. The places named are all within 40 minutes' ride of San Francisco, and their population of over 100,000 is mainly composed of people who to all intents and purposes are San Franciscans, most of them being engaged in business in the city. The three last named are largely made up of summer homes. The small towns on the peninsula are also largely inhabited by San Franciscans. Burlingame, a fashionable resort modeled after Tuxedo, is 25 miles south of the city. Menlo Park, near by, contains the residences of numerous wealthy men. Palo Alto, the seat of Leland Stanford Jr. University, is on the peninsula about 30 miles from the city, and the California University is situated at Berkeley. Both of these great universities have intimate relations with the city, the latter, a State institution, maintaining several affiliated colleges within the city's boundaries. A part of the great endowment of 'Stanford' is in San Francisco.

The famous resort, the Cliff House, from whose piazza hundreds of seals may be seen disporting in the water and on the rocks, and the near-by beach, are visited by many thousands every Sunday and holiday. Mount Tamalpais, situated in one of the trans-bay counties, is accessible by ferry and train in about two hours. Its elevation is 2392 feet, and it commands a view of the city, half a score of towns, and the bay and the ocean.

COMMERCE AND INDUSTRY. The importance of San Francisco is due to its position on the bay of that name (q.v.), which is accounted one of the finest harbors in the world. The area of the harbor is 450 square miles, and its width varies from 5 to 12 miles. It is navigable by the largest vessels for a distance of over 40 miles from its single opening to the ocean, the famous Golden Gate, the entrance to which is a mile in width. There are several steamship lines to China and Japan, Australia, Mexico, Central and South America, and the Hawaiian, and Philippine Islands. An active coastwise commerce is carried on with Alaska, the ports of Puget Sound, and those on the southern coast of California. There is also regular communication with the ports of the Atlantic. In addition, a large fleet of sailing vessels bear to Europe the surplus grain and miscellaneous merchandise of California, most of which passes through this port.

For the year ending December 31, 1905, the exports of foreign and domestic commerce were valued at $47,727,011, and the imports at $44,240,984. A great deal of gold and silver passes through San Francisco, the exports in 1905 being $5,144,880, and the imports nearly $12,000,000. The exports of wheat have reached as high as 24,862,095 cwt. in a single year. In the year ending December 31, 1905, the grain shipped by sea amounted to 19,433,053 bushels. In 1905 the receipts of wine amounted to 16,697,962 gallons, of which 644,134 gallons were exported by sea. In the same year 366,823 cases of salmon were exported. Coffee is largely imported from Central America, Ecuador, Mexico, and the East Indies, the quantity in 1905 being 37,559,264 pounds. A great part is for distribution in the States and Territories west of the Mississippi. Imports of tea from China and Japan were 8,818,744 pounds in 1905. The receipts of customs amounted to $7,173,686 in the year ending June 30, 1905. The activity of trade is reflected in the bank clearings, which increased steadily from $692,806,000 in 1896 to $1,513,927,257 in 1904. A great increase has been noted since the Spanish-American War.

San Francisco is rated as the tenth in importance of the manufacturing cities of the United States. The census of 1900 credits it with 4002 establishments, 41,978 wage-earners, $80,103,367 capital employed, and an output valued at $133,069,416. Sugar refining, slaughtering, and meat packing, and the manufacture of foundry and machine shop products are most important industries. Shipbuilding has made considerable progress. Battleships and merchant vessels are constructed in San Francisco yards, the *Oregon* and the *Olympia* being noteworthy examples of the former.

GOVERNMENT AND FINANCE. San Francisco is governed under a charter adopted by the people, which went into effect January 1, 1900. With the exception of some bonds issued in 1874-75 for the acquisition of a park, now nearly matured, and

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SAN FRANCISCO
CITY HALL (UPPER)
UNION SQUARE (LOWER)

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to meet which a sinking fund exists, the city is absolutely free from debt. The charter under which the municipality is now governed is as rigidly drawn as the act it displaced, limiting the rate of taxation for ordinary municipal purposes to 1 per cent. on the assessed valuation of all property. An extra tax may be levied to meet unusual requirements, and there is a comprehensive license system. The assessed value of all property on March 1, 1904, was $502,000,000. The expenditures provided for in the budget of 1904 aggregated $6,299,388, the chief items being: Public schools, $1,385,617; police, $1,047,053; fire department, $943,603; general government, $900,347; health department, $419,035; highways, $506,735; park fund, $349,339; charities and corrections, $484,409. It has been found in practice, however, that very little is spared for permanent improvements from the ordinary revenues. There is an active movement in San Francisco looking to the acquisition of a municipal water system, the present supply being derived from a private corporation's reservoirs on the peninsula. The project contemplates the bringing of a larger supply from the Sierra Nevada Mountains, and the cost will probably reach $25,000,000. A two-thirds vote of the people is required to authorize a bond issue. In addition to the safeguards mentioned, the charter has created a civil service system based on merit, and it places great power in the hands of the mayor, who by his veto, which can be overridden only by a five-sixth vote of the board of supervisors, can prevent the adoption of separate items in the budget. He is also endowed with an extensive appointing power and the right to remove his own appointees, but the courts have curtailed the latter. The board of public works is an appointive body and has control of streets, sewers, buildings, and all public improvements.

POPULATION. San Francisco has grown very rapidly. The population in 1860 was 56,802; in 1870, 149,473; in 1880, 233,959; in 1890, 298,997; in 1900, 342,782. One-third of the population in 1900 was of foreign birth. Of these the Germans numbered 35,194; Irish, 18,963; English, Scotch, and Welsh, 12,342; Italians, 7508; and Chinese, 13,954. The Chinese live in a distinct quarter, which has taken on many of the characteristics of their native land. This quarter, known as 'Chinatown,' is freely visited by strangers, who are attracted by its Oriental aspect. There has been a great diminution in the number of Chinese in recent years, owing to the operation of the Exclusion Act. In 1890 there were 25,833 enumerated. Though this class of Orientals is diminishing, Japanese are coming in rapidly. They aggregate several thousand already, but, unlike the Chinese, they do not segregate themselves. The population by Federal estimate June, 1904, was 360,298.

HISTORY. The first settlement in this locality was made on October 9, 1776, when two Franciscan monks, Palou and Cambon, established here an Indian mission, which they called San Francisco de Asisi, the name San Francisco having been previously given (in 1769) to the bay. About this mission, after the Mexicans secured control of California in 1822, a small village called Dolores grew up. The mission itself prospered until 1834, when it was secularized, and in a few years thereafter little remained but the adobe buildings. In 1836, near the best anchorage and three miles northeast of the mission, a small trading village, Yerba Buena, was founded, and from it the modern city really developed. In 1846 the United States took possession; and in the following year, its population then being 450, Yerba Buena exchanged its old name for that of the mission and the bay. On the discovery of gold in California in 1848 people of every social stratum and of many nationalities flocked hither, and the population of San Francisco increased with tremendous rapidity. In March, 1848, it was 800; in September, 1849, it was at least 10,000. In June, 1849, there were scarcely 50 houses; in September there were at least 500. The buildings were constructed of the most combustible materials and were huddled close together, so that the early years were marked by terrible ravages of fire. In the five big fires of December 14, 1849, May 4, 1850, June 14, 1850, May 2, 1851, and June 2, 1851, the property destroyed reached an aggregate value of $16,000,000. Owing to the wild and turbulent character of much of the population and the lax enforcement of law by the constituted authorities, vigilance committees were organized in 1851 and 1856, and for a time tried, convicted, and punished criminals in an extra-judicial manner. In 1854 overspeculation and a diminishing return from the mines caused a temporary check to the growth of the city; but in 1858 a new period of prosperity opened. San Francisco was incorporated in 1850 and in 1856 the city and the county were consolidated. An earthquake did some damage on October 21, 1868. In 1877-78 San Francisco was the centre of the movement known as Kearneyism in California. (See KEARNEY, DENIS.) With the completion of the Union Pacific Railroad to the coast in 1869, the city entered upon a new period of prosperity.

Consult: Soule and others, *The Annals of San Francisco* (New York, 1855), for a graphic contemporary account of conditions during the period of excitement over the discovery of gold; also Royce, *California* (Boston, 1886); *San Francisco and Its Resources* (Denver, 1893); and a chapter in Powell (ed.), *Historic Towns of the Western States* (New York, 1901).

SAN FRANCISCO BAY. An inlet of the Pacific Ocean indenting the coast of California (Map: California, B 3). It is 42 miles long and from 5 to 12 miles wide, and runs nearly parallel with the coast, being separated from the ocean by a peninsula 7 miles wide, at the north end of which is the city of San Francisco. North of the city the Golden Gate, a passage one mile wide and 4 miles long, connects the bay with the ocean. San Francisco Bay is a beautiful sheet of water completely shut in by wooded mountains 1000 to over 2000 feet high. The water is generally shallow far out from the shores, but the Golden Gate and the part of the bay adjoining San Francisco as well as a central channel running through its whole length have a depth of 30 to over 100 feet. On the north the bay communicates with the Bay of San Pablo, which is of circular form with a diameter of 10 miles, and which further communicates through the Straits of Karquines with Suison Bay. The latter receives the Sacramento and San Joaquin rivers, so that the drainage of the entire western slope of the Sierra Nevada passes out through the Golden Gate.

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SAN FRANCISCO EARTHQUAKE. At 5.13 o'clock on the morning of April 18, 1906, the people of San Francisco and a very large district along the adjacent Pacific Coast were awakened by the first tremors of an earthquake. Light shocks are not uncommon in California, but in this case the movements became unusually violent in many localities and the ground rocked and swayed to such an extent that many buildings were wrecked, movable objects shifted, and occasionally animals were thrown violently to the ground. This was repeated a few minutes later and followed by comparatively slight shocks for several days. The area affected was at least 450 miles in length extending from Eureka in Humboldt County, to the southern extremity of Fresno County, and probably 50 miles wide at most points, and at many places the violence of the shock seems to have exceeded that felt in San Francisco, but, because of its density of population and subsequent disasters, the attention of the world was centred for several days on that city.

The people, somewhat accustomed to slight disturbances of this kind, would soon have returned to their houses but for the repetition and attendant dangers. The streets were crowded with people whose sole thought at first seemed to be to reach more open and safe ground, or escape from the city entirely. The creaking walls, swaying chandeliers, and toppling chimneys lent a reality to the dangers of their vicinity that could not be disregarded. Observers on the ground noted that some of the walls of buildings had fallen, that the streets were more or less obstructed with fallen debris, that here and there the ground was distorted into miniature hillocks and hollows, and that occasionally cracks yawned at their feet. There is no doubt but that such damage would soon have been repaired and the dangers forgotten except for the more serious conditions that at once developed. With the destruction of the first shock a few fires were started in the lower part of the city. The fire department responded with confidence in their ability to control them, only to find that the earthquake had damaged the water mains to such extent that there was now no supply adequate to the unusual demands of the situation. With the fire department practically helpless the city was soon the scene of one of the most extensive and hopeless conflagrations of modern times. When the utter hopelessness of the situation became known a general exodus from the zone of more immediate danger began, which added immeasurably to the first confusion by reason of the efforts made to move the most highly prized personal effects.

For three days this conflagration raged in the heart of the business section. By the end of the first day an area along Market Street as far as 10th street and from 4 to 6 blocks on each side had been destroyed by fire. With water from the bay and with the aid of the Navy a narrow belt along the water front was saved. Later on, by the 20th, salt water was used to fight the progress of the fire at greater distance through a mile of hose length. By the 21st and 22d the repairs upon the local water system began to give additional relief. On the 21st, as a result of extreme emergency measures, the fire was reported under control, and the rest of the city out of danger.

It was estimated that half of the population spent the night of the 19th under the open sky in the parks and streets—200,000 people camped in Golden Gate Park and 50,000 in the Presidio Military Reservation.

EMERGENCY MEASURES. The seriousness of the situation was grasped at once by the officials in whose hands lay the means of organizing relief and protection. General Funston, who was stationed at the Presidio, without waiting for orders from Washington, at once sent out detachments of troops to patrol the city. On the afternoon of the first day Mayor Schmitz called together over 40 of the leading men of the city to discuss measures for the emergency. This was announced as the Committee of Safety, also known as the Committee of Forty, and through it and its subcommittees and connections were carried out the measures that finally saved a part of the city and protected its people from famine and restored order. It was early appreciated that there must be strong-handed control and a systematic disregard of the usual rights of the individual in favor of the common good. The city was placed under martial rule. Rigid discipline was enforced. An officer's order or even a soldier's request became law and from it there was no appeal. Men on their way to safety were impressed for service in fighting the fire, or clearing the streets, or aiding the helpless. Conveyances were halted in their progress, no matter in what important private interests they were engaged and dispatched upon emergency errands for the public. Stocks of goods were confiscated and, under the emergency authorities, appropriated to the relief of those in most immediate need. Disobedience or even hesitation was in many cases visited with extreme harshness. The patrols were ordered to shoot vandals at sight. Under the excitement of the time and the confusion of the people, and the haste with which decision had to be made, as well as the inexperience of many of the patrol, it is not surprising that the bounds of strict justice were occasionally over-stepped. It is well recognized that the highest praise is due as a whole. In the earlier days there was occasional conflict of authority between the representatives of the different forces, but this was arranged on the 21st, by the division of the city into three districts, one each to be given to the city police, State, and Federal troops, and a plan of cooperation agreed upon.

The failure of water forced a resort to destruction of buildings in order to remove the means of progress of the fire. Dynamite was used until the supply gave out and then artillery was employed to finish the work. A mile of buildings along Van Ness Avenue was blown up on the 19th. There was not a sound water main east of this line and later, after being driven from a most heroic stand at Knob Hill, it was decided to bombard everything east of Van Ness Avenue. Although the fires repeatedly crossed the lines thus drawn for them, yet it was chiefly by such measures, together with the reaching of a few more open spaces and a shifting of the wind, that they were finally brought under control. But by that time a third of the city had been laid in ruins, all of the business section had been destroyed, every one of the 44 banks was in the burned area, over $200,000,000 worth of buildings had been lost, and it was estimated that 250,000 people were homeless, many of them wholly ruined financially and reduced to hunger and absolute want.

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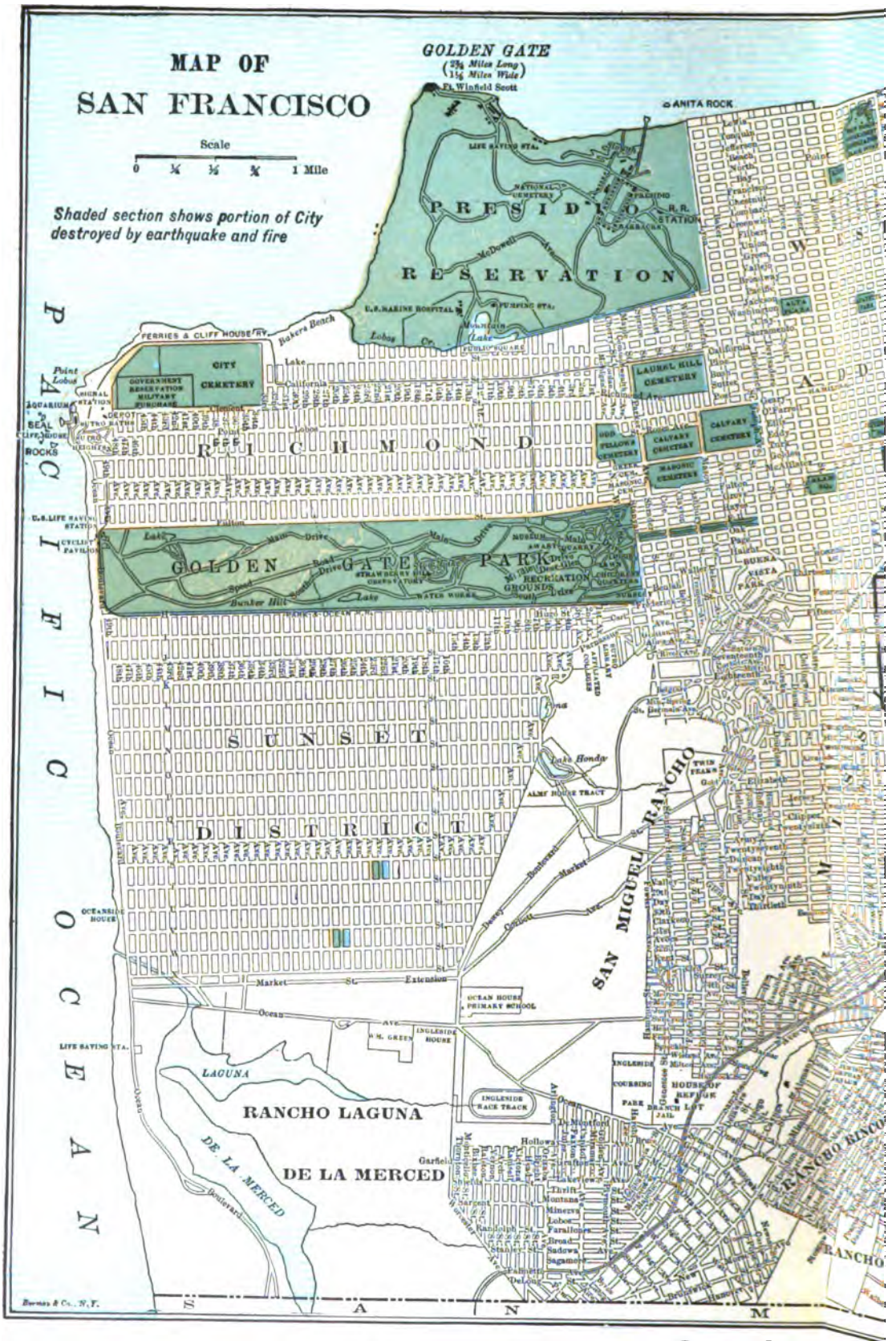

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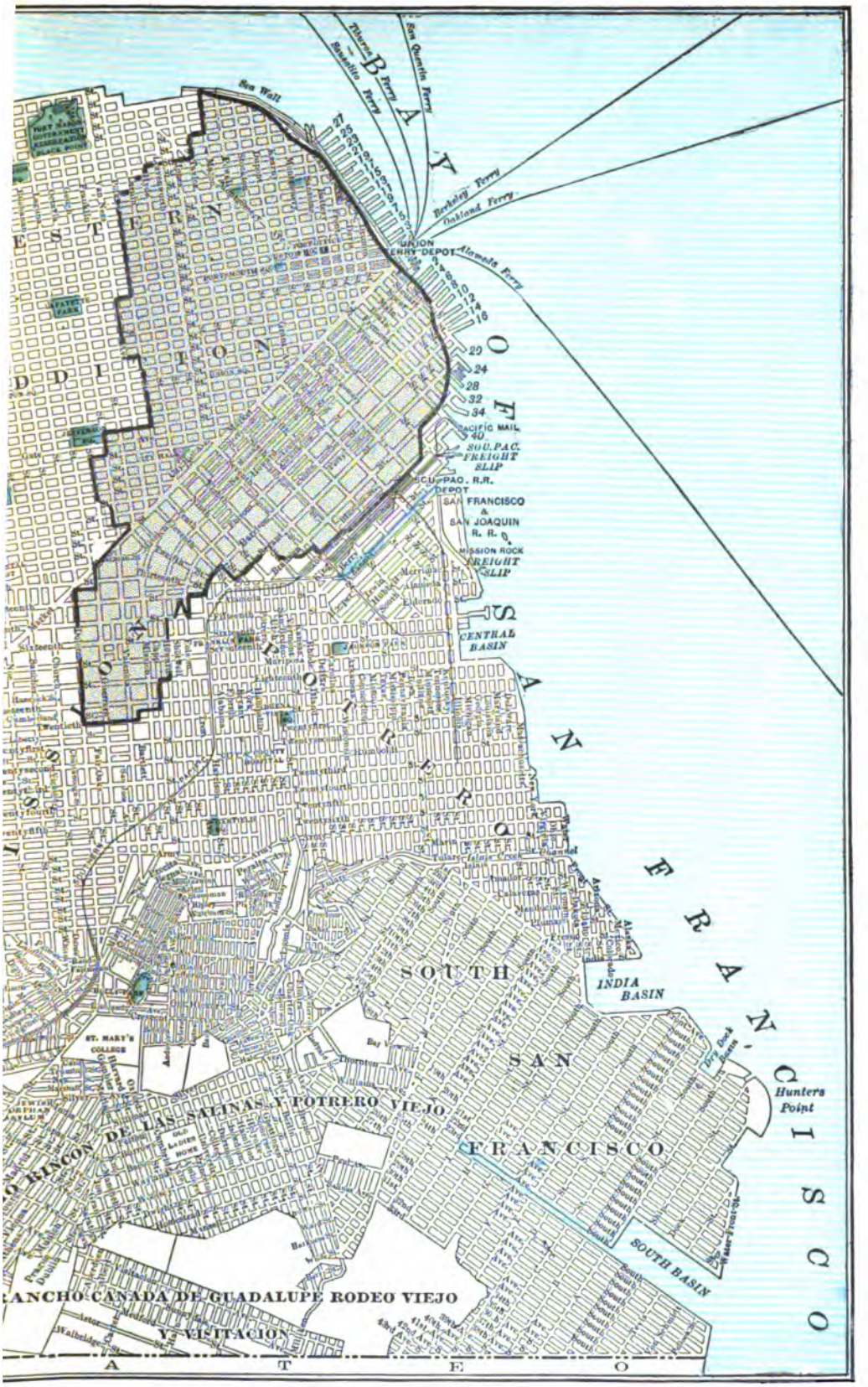

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But the water front was saved, as was also the district to the west of Van Ness Avenue, Octavia, and Dolores Streets, including nearly all of the handsome private residences, except those of Knob Hill, capable of housing 250,000 to 300,000 people. Even in the burned district many buildings resisted the shock and fire so well that steps were soon taken to repair and reoccupy them. Among such are the Crocker, Union Trust, Merchants Exchange, Kohl, Mills, Call, Mutual Savings buildings, the Hotel St. Francis, the United States Post-office and others of similar importance. The Call was re-occupied on the lower floors within a month. By May 21, many of the banking houses, and within six weeks every one was again open. Some of the largest construction companies were not heavily damaged, and such firms as the Union Iron Works and Risdon Iron Works were soon able to undertake contracts. Many of the San Francisco Art Treasures, some of them masterpieces, such as William Keith's "The Snows of the Sierras," were saved even from the ruined district. Many paintings from the Mark Hopkins Institute of Art were saved in the emergency by cutting the canvases from the frames and rolling them into bundles. On the 27th of April the street railways resumed business. After this date also there were no confiscations of property, and 300 retail stores were established, and the newspapers of the city were appearing regularly.

As an offset to the losses there was estimated to be $208,000,000 insurance in 108 companies, most of which would be paid. All the strong companies, waiving all technicalities, soon began to settle their claims.

RELIEF. On the 19th offers of aid were made by every large city in the United States, Congress by joint resolution voted $1,000,000, the Red Cross took steps to use its organization to the utmost, sending Dr. Edward T. Devine as its special representative, and the cities nearest began to forward food and other supplies by the train load. General Funston's call for food, tents, and blankets elicited a prompt response. By Sunday, the 22d, food in plenty had reached the city, rations were distributed regularly to all comers, the water system had been somewhat repaired and was supplying 6,000,000 gallons of water daily, and famine conditions were relieved. By the 23d, the people of the United States had subscribed $10,000,000 to the Relief Fund, and Congress voted $1,500,000 more. On the 24th, all local relief measures were organized and placed under the control of the Finance Committee of the Relief and Red Cross Funds which continued in charge. Up to September 15th, Dr. Devine reports as follows: amount of cash received, $5,867,479; amount expended, $3,368,641, leaving in the treasury, $2,498,838. Of the amounts not yet transferred to San Francisco, $1,873,356 is in the treasury of the Red Cross in Washington; $585,677 in New York; a little over $250,000 in the New York Chamber of Commerce; a little less than $250,000 in the Massachusetts Relief Association treasury; $152,828 in the Chicago Commercial Association; and of local untouched subscriptions in San Francisco, $65,428.

SCIENTIFIC FEATURES. On the third day after the shock Governor Pardee appointed a State Earthquake Investigation Commission, naming as its chairman Professor A. C. Lawson of the State University. With him were associated seven other geologists. A preliminary report of this Commission is printed in *Science* of June 20, 1906. The cause of the earthquake was a displacement along a very extensive and well marked fault line that extends in a general N. 35° W. for several hundred miles at a slight angle with the coast line. Movement is known to have taken place along this line for a distance of 185 miles. All fences, roads, stream courses, pipe lines, dams, conduits, and property lines that cross this line were dislocated. The amount varies from 6 to 20 feet, probably averaging 10 feet. The country to the southwest of the line is permanently displaced northwesterly with reference to that on the opposite side. All effects of the shock diminish gradually with distance from this fault line. At a distance of 20 miles only an occasional chimney is thrown down, at 75 miles there were no destructive effects. The most notable exceptions to the strict rule of distance are San José, 12 miles, and San Francisco, 8 miles from the main fault. The greater destruction to San José is described to the deep alluvial soil, and, in the low lying portions of San Francisco, to the loose-made ground of the reclaimed bay. The results of the disaster show that much greater destruction was caused to buildings standing on loose ground instead of rock. In all cases structures of good design and honest construction stood the shock remarkably well. The steel frame structure, even of great height, proved itself to entire satisfaction.

In the 36 years from 1850 to 1886 there were 254 separate light shocks felt in San Francisco, and 514 in the State. A severe one occurred in 1865, and one in 1898 did considerable damage in San Francisco.

The last previous one of consequence was in January, 1900. The exact time of the earthquake of 1906, which will now be known as the great San Francisco Earthquake, as recorded in the Observatory at Berkeley was 5h. 12m. 6s. Pacific Standard time, and the end of the shock 5h. 13m. 11s., A.M., April 18, 1906, the duration being 1m. 5s. Within an hour of the main shock 12 minor shocks were observed, and before 6h. 52m., P.M., of the same day 31 shocks were noted. These minor shocks continued for many days.

FATALITIES. Because of the immensity of the conflagration and consequent confusion, data of all kinds given out at the time were somewhat overestimated. The San Francisco earthquake stands as one of the greatest of its kind in total destruction, yet one of the lowest in loss of life. This further enforces the conclusion reached by all competent observers on the ground that the earthquake itself had caused comparatively little damage in spite of its intensity, and that the real disaster was from fire which, because of injury to the water supply, got beyond control. The resultant fire, exposure, and famine were responsible for a large percentage of the fatalities that may be charged indirectly to the earthquake. The most complete figures available given out by the Health Department four months after the disaster are that 452 persons lost their lives as the result of the earthquake, and the days of disaster and privation that followed it. Of these victims 266 were killed by falling walls, 177 perished by fire, 7 were shot, 2 died as the result of ptomaine poison due to 'emergency' canned goods of poor quality. 420 were white persons, 18 Chinese, and 4 Japanese. Eleven were less than a year old.

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SAN FRANCISCO MOUNTAIN. The highest peak in Arizona, situated near Flagstaff in the north central part of the Territory (Map: Arizona, C 2). It rises abruptly 5000 feet above the Colorado plateau to an altitude of 12,794 feet. Its core is of volcanic formation and it is capped by a mass of lava in which there is an extinct crater. The body of the mountain, however, is formed by circumdenudation, the Triassic sandstone composing the sides being protected by the hard lava-cap while the surrounding portions were worn away. The sandstone escarpment is now almost completely hidden by a talus of volcanic detritus. The mountain is a conspicuous landmark; the surrounding region has displayed fresh volcanic activity since the denudation of the plateau, and from the summit more than a hundred craters may be seen.

SANGALLO, sän-gäl'lô. A celebrated family of Italian architects of the Renaissance.—GIULIANO (1445-1516), the first to be distinguished and most important member of the family, was born in Florence, the oldest son of Francesco Giamberti, a woodworker. While very young he studied with Francione, a worker in tarsia (q.v.), but he acquired his architectural training among the ancient monuments of Rome. Returning to Florence to enter the army in the war with Naples in 1478, he gained great favor with Lorenzo de' Medici for his skill as a military engineer. For him he built the villa at Poggio a Cajano, where Lorenzo and his circle of humanists held their famous sessions, the beautiful Church of Madonna delle Carceri at Prato, and the Augustine convent at Florence, near the San Gallo gate, from which he derived the name later assumed by the family. He designed the Gondi Palace and the celebrated Strozzi Palace, for which Benedetto da Majano has received the credit, and built for Giuliano delle Rovere the fortress at Ostia. After the death of Lorenzo de' Medici, he designed the ceiling of Santa Maria Maggiore and the cloister of San Pietro in Vincoli, and in 1503 he designed the first plans for Saint Peter's. Replaced by Bramante, he returned to Florence in 1509, taking part in the capture of Pisa. Upon the accession of Pope Leo X., formerly Cardinal Giovanni de' Medici, he was associate architect with Raphael at Saint Peter's, serving in this capacity for about two years. He died at Florence, October 20, 1516. In the Uffizi Gallery at Florence, the Barberini Library at Rome, and at Siena, are many of his drawings which are of extraordinary merit. His work as an architect, although he was one of the most important architects of the Early Renaissance, was somewhat overshadowed by his prowess as a military engineer.

ANTONIO DA SANGALLO, the elder (1455-1534), a younger brother of Giuliano, had a very similar career, excelling both as an architect and military engineer. He was employed by Pope Alexander VI. in fortification work at the Castle of Sant' Angelo, at Civita Castellana, and at Nepi. He reconstructed the church at Arezzo and built the fine portico of the Annunziata, Florence, for Pope Leo X. His best work as an architect is the Church of the Madonna di San Biagio at Monte Pulciano, where he also built the Cervini, Tarugi, and Bellarmini palaces. He took part in the defense of Florence when it was besieged in 1530, and died December 27, 1534. Many of his drawings and plans are preserved at the Uffizi Gallery.

ANTONIO CORDIANI DA SANGALLO, called the younger (1485-1546), was a son of Giuliano. He went to Rome at eighteen years of age, studied with Bramante, and did important work for forty-one years under the popes Leo X., Clement VII., and Paul III. He was employed on the Castle of Sant' Angelo and at Saint Peter's, nearly finished the Farnese Palace at Rome, and completed the Santa Maria di Loreto, at Loreto. With his brother Battista, he was engaged upon the villa Madama in Rome, usually attributed to Raphael. In 1518 he was appointed to succeed Raphael as architect of Saint Peter's and of the Vatican Palace. His model for the church is still in existence. (See SAINT PETER'S CHURCH.) His work as a military engineer was very extensive, comprising more than a dozen fortifications. He died at Terni, October 3, 1546.

SANGERHAUSEN, zäng'ĕr-hou'zen. A town in the Province of Saxony, Prussia, 36 miles by rail west of Halle (Map: Germany, D 3). Saint Ulrich is a splendid basilica, founded in the twelfth century, and recently rebuilt. There are two castles and two hospitals, dating from the thirteenth and fourteenth centuries. The manufactures include footwear, machinery, and other iron and steel products. Population, in 1900, 12,077, chiefly Protestants. Sangerhausen is mentioned in 991.

SAN GERMAN, sän hĕr-män'. A town of the Department of Mayaguez, Porto Rico, 10 miles south of the town of Mayaguez, on the coast, at the mouth of the river Guanajibo (Map: Porto Rico, A 2). Sugar, coffee, cacao, tobacco, and fruits are the principal exports. Population, in 1899, 3954.

SAN GIL, hĕl, or **SAN JIL.** A town of the Department of Santander, Colombia, 150 miles northeast of the city of Bogotá, on the right bank of the Gil River (Map: Colombia, C 2). The manufactures are sulphate of quinine, straw hats, and cotton counterpanes; the agricultural products, cotton, sugar-cane, and tobacco. Population, in 1886, 10,038.

SAN GIMIGNANO, jē'mē-nyä'nô. A city in Italy, 7½ miles by carriage road west of Poggibonsi, which is 43 miles south of Florence (Map: Italy, E 4). The walls, the towers, and the Gothic architecture present a faithful picture of the age of Dante. The Palazzo Pubblico, built 1288-1323, contains many ancient frescoes and paintings. There is an interesting public library. The Church of Sant' Agostino, built 1463-65, contains frescoes by Benozzo Gozzoli, the pupil of Fra Angelico. Population of commune, in 1901, 9848.

SAN GIOVANNI A TEDUCCIO, sän jô-vän'nē ä tä-dōō'chô. A suburb of Naples, Italy, situated in the direction of Portici (Map: Italy, D 11). Population of commune, in 1901, 20,797.

SAN GIOVANNI IN FIORE, ĭn fē-ō'rā. A city in the Province of Cosenza, Italy, 12 hours by stage east of the city of Cosenza (Map: Italy, L 8). It is the principal place in the lofty (6325 feet) Sila Mountains. The district produces grain, fruit, wine, and fine cattle. Population of commune, in 1901, 12,114.

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BLOODROOT, ETC.

1. CULVER'S ROOT (Leptandra Virginica).
2. BLOODROOT (Sanguinaria Canadensis).
3. RED CLOVER (Trifolium pratense).
4. DUTCHMAN'S BREECHES (Dicentra cucullaria).
5. BLACK COHOSH (Cimicifuga racemosa).

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SAN GIOVANNI IN PERSICETO, pĕr'sē-chä'tō. A town in the Province of Bologna, Italy, about 15 miles by rail northwest of Bologna. It has mineral springs, manufactures ironware, and markets grain. Population (commune), in 1901, 15,893.

SAN GIOVANNI ROTONDO, rō-tŏn'dō. A city in the Province of Foggia, Italy, 28 miles northeast of the city of Foggia and 15 miles north of Fontanarosa, the nearest railway station (Map: Italy, K 6). It is beautifully situated on a slope of Monte Gargano. It markets wine, oats, potatoes, and cattle, and manufactures linen. Population of commune, in 1901, 10,122.

SANGIR (sän-gēr') **ISLANDS.** A chain of small islands in the Malay Archipelago, belonging to the Netherlands, extending from the northeastern end of Celebes northward to Mindanao, Philippines, and separating the Celebes Sea from the Pacific Ocean (Map: East India Islands, G 4). It consists of about 50 islands with a total area of 408 square miles, of which 308 square miles are taken up by Great Sangir, the largest in the group. They are of volcanic origin. There are several active craters, notably Abu on Great Sangir, which has frequently caused great loss of life. The islands are covered with forests yielding excellent timber and cabinet woods, and cocoa, sago, rice, tobacco, and sugar are also produced. The inhabitants are Alfuros, partly Christians and Mohammedans, partly pagans. Together with the neighboring Talauer Islands the Sangirs belong to the Dutch Residency of Menado, and the combined population of the two groups was estimated in 1895 at 113,467.

SANGRE DE CRISTO, sän'grā dā krēs'tō. A range of the Rocky Mountains in south-central Colorado, bounding the San Luis Park on the northeast (Map: Colorado, E 2). It rises steeply from the floor of the park to a height of 5500 feet above it. Its crest maintains an altitude of 13,000 feet above the sea for 15 miles and 12,000 feet for over 30 miles. Its highest point, Blanca Peak, has an altitude of 14,390 feet, and is one of the two highest peaks of Colorado.

SANG'STER, CHARLES (1822-93). A Canadian poet, born at Kingston, Ontario. For fifteen years he conducted newspapers at Amherstburg and Kingston; and from 1868 to his retirement in 1886, he was connected with the Post-Office Department at Ottawa. He was one of the earliest among the native English-Canadian poets. Perhaps his best known poem is the stirring "England and America." His published volumes comprise *The St. Lawrence and the Saguenay, and Other Poems* (1856); and *Hesperus and Other Poems and Lyrics* (1860).

SANGSTER, MARGARET ELIZABETH (MUNSON) (1838—). An American journalist, poet, and juvenile moralist, born at New Rochelle, N. Y. She was privately educated, chiefly in New York. She contributed to many periodicals, became associate editor of *Hearth and Home* (1871-73), of *The Christian At Work* (1873-79), of *The Christian Intelligencer* (1879), of *Harper's Young People* (1882-89), and of *Harper's Bazaar* (1889-99), besides contributing regularly to other journals. In book form she published *Manual of Missions of the Reformed Church in America* (1878), and numerous essays and poems.

SANGUILE, sän-gē'lā. Collective name of certain little-known tribes in Southern Mindanao. See PHILIPPINE ISLANDS.

SANGUINARIA (Lat. *sanguinaria*, fem. sg. of *sanguinarius*, relating to blood, from *sanguis*, blood, so called because supposed to stanch blood, but in modern usage because of the blood-like juice). A genus of plants of the natural order Papaveraceæ. *Sanguinaria Canadensis*, the only species, the bloodroot or puccoon of Eastern North America, has a fleshy rootstock with a red, acrid juice, found also in the stalks. The large white flowers, which appear in early spring, are solitary, and arise from the root, on short stalks usually surrounded by the solitary roundish heart-shaped radical leaves.

SANGUINE (OF., Fr. *sanguin*, bloody), or MURREY. One of the tinctures in heraldry (q.v.).

SAN'HEDRIN (Heb. *sanhedrin*, from Gk. *συνέδριον*, *synedrion*, council, from *σύν*, *syn*, together + *ἕδρα*, *hedra*, seat). The name in ancient times of the highest court of justice and supreme council in Jerusalem, in a wider sense applied also to lower courts of justice. Josephus designates the council established by Gabinius, the Roman Governor of Syria (B.C. 57-54), in each of the five districts of Palestine as synedrion, but this intentional degradation of the Synedrion at Jerusalem points to the introduction of the term at an earlier period, and in fact it occurs in the Greek translation of the Old Testament (second century B.C). According to the Talmud, also, the name goes back to the second century, for the chief council in the days of John Hyrcanus is called a Sadducean Sanhedrin (*Tal. Bab.*, Sanhedrin, 52b). The Sanhedrin is identical with the *Gerousia*, which occurs as a designation of the chief Jewish council in the days of Antiochus the Great (c.200 B.C.) and somewhat later. The degradation of the Jerusalem Sanhedrin by Gabinius was only temporary, and soon after we find the council at Jerusalem exercising supreme authority and even utilized by rulers to serve their ends. The Sanhedrin of Jerusalem, as finally constituted, consisted of 71 members, and was presided over by the *Āb-bēth-dīn* ('Father of the Tribunal'), with whom was associated in the post-Hadrianic era the *Nāsī* (Prince). Its members belonged to the different classes of society. There were priests; elders, that is, heads of families, men of age and experience; scribes, or doctors of the law; and others exalted by eminent learning, but we have no authentic source for determining who composed the Sanhedrin or on what principle vacancies were filled. The presidency appears to have been conferred for a time on the high priest in preference, if he happened to possess the requisite qualities of eminence; otherwise 'he who excels all others in wisdom' was appointed, irrespective of his station. The limits of its jurisdiction are not known with certainty; but there is no doubt that the supreme decision over life and death and all questions of general importance were exclusively in its hands. Besides this, however, the regulation of the sacred times and seasons, and many matters connected with the cultus in general, except the sacerdotal part, which was regulated by a special court of priests, were vested in it. It fixed the beginnings of the new moons; intercalated the years when necessary; watched over the purity of the priestly families by carefully examining the pedigrees

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of those priests born out of Palestine, so that none born from a suspicious or ill-famed mother should be admitted to the sacred service; and the like. By degrees the whole internal administration of the commonwealth was vested in this body, and it became necessary to establish minor courts, similarly composed, all over the country, and in Jerusalem itself. Thus we hear of two inferior tribunals at Jerusalem, each consisting of 23 men (lesser synedrion), and others of three men only. These courts, however, probably represent only smaller or larger committees chosen from the general body. Excluded from the office of judge were those born in adultery; men born of non-Israelitish parents; gamblers, usurers; those who sold fruit grown in the Sabbatical year; and, in single cases, near relatives. All these were also not admitted as witnesses. Two clerks were always present, one registering the condemnatory, the other the exculpatory votes; and, according to another opinion, there was still a third clerk who noted all the votes as a kind of check. The mode of procedure was exceedingly complicated; and such was the caution of the court, especially in matters of life and death, that capital punishment was pronounced in the rarest instances only. The general place of assembly was a certain hall (*lishkat hagaziz*, 'hall of hewn stones'), probably situated at the southeast corner of one of the courts of the temple. With exception of Sabbath and feast days it met daily. The double presidency of the Nasi and Ab-beth-din appears to have been instituted to insure greater impartiality, those chosen representing the two factions or two diverging tendencies in the interpretation of the law. In questions involving civil rights, the voting began with the principal members; in questions of life and death with the younger members, so that they might not be influenced by the leaders. Twenty-three members constituted a quorum for judgments of life and death, but if the court showed a majority of only one for 'guilty,' the number had to be increased by two successively till the full court was formed; and only in the case of a full court was a majority of one against the prisoner sufficient for condemnation. The Sanhedrin survived the fall of Jerusalem and what it lost in authority it gained in the veneration in which it continued to be held by the Jews, both in Palestine and in the dispersion. As late as the fifth century we find an institution in Jerusalem that can be regarded as a continuation of the great Sanhedrin. Subsequently, however, we find the name applied to a body of the most eminent scholars of Babylonia—to the 70 members of the learned assemblies that occupied the first seven rows.

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SAN IGNACIO DE AGAÑA, sän ĕg-nä'-thē-ō dā ä-gä'nyä. See AGAÑA.

SAN ILDEFONSO, ēl'dā-fōn'sō, or LA GRANJA. A town in the Province of Segovia, Spain, situated 34 miles northwest of Madrid at an elevation of nearly 4000 feet, in the region of romantic beauty on the northern slope of the Sierra de Guadarrama (Map: Spain, C 2). The town itself is beautifully laid out with fine plazas, promenades, and gardens, and numerous monumental fountains; it has been called the Versailles of Spain. It owes its existence to the splendid palace built there in 1721-24 by Philip V., which has since been a summer residence of the Spanish Court. It is a beautiful building, the entire façade of which is faced by a row of tall columns reaching to the roof. The interior is luxuriously furnished, containing several hundred fine paintings and sculptures. The palace is surrounded by magnificent gardens with lakes, fountains, and statues. Here occurred the so-called 'Revolution of La Granja,' on the 12th of August, 1836, when some of the Liberal leaders compelled Queen Christina to sign a decree restoring the Constitution of 1812. Population, in 1900, 3444. See SAN ILDEFONSO, TREATY OF.

SAN ILDEFONSO, TREATY OF. A secret treaty between France and Spain, negotiated in October, 1800. France agreed to procure in Italy for the Duke of Parma, the son-in-law of Carlos IV. of Spain, a kingdom which should have a population of from 1,000,000 to 1,200,000, while Spain agreed to retrocede to France, six months after France had carried out her part of the agreement, "the colony or province of Louisiana with the same extent that it had in the hands of Spain and when France owned it, and as it should be according to subsequent treaties between Spain and other powers." In addition the treaty contained several less important provisions. The preliminary treaty was signed on October 1st, and the exchange of ratifications took place on the 30th of the same month. The treaty was modified in some respects by a new treaty negotiated at Aranjuez, March 21, 1801 (ratification being exchanged April 11), the immediate transfer of Louisiana being provided for. The texts of the two treaties may be found in De Clercq, *Recueil des traités de la France*, vol. i. (Paris, 1864).

SAN ISIDRO, ē-sē'drō. The capital of the Province of Nueva Ecija, in Luzon, Philippines (Map: Philippine Islands, E 4). It is situated on the Rio Grande de la Pampanga, 48 miles north of Manila, has a telegraph station and good road connections with Manila and other cities of Central Luzon. Population (estimated), in 1899, 7056.

SANITARY COMMISSION (from Lat. *sanitas*, health, from *sanus*, sound, healthy, sane; connected with Gk. *σάος*, *saos*, *σῶς*, *sōs*, safe, sound), UNITED STATES. An organization formed during the Civil War primarily for the relief of the sick and wounded soldiers of the Union army. On the day on which President Lincoln's call for volunteers was issued the women of various cities in the North organized societies for the purpose of affording relief and comfort to the sick and wounded volunteers. They stated their purpose to be "to supply nurses for the sick; to bring them home when practicable; to purchase clothing, provisions, and matters of comfort not supplied by the Government; to send books and newspapers to the camps; to preserve a record of the services of each soldier; and to hold constant communication with the officers of the regiments in order that the people might be kept

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informed of the condition of their friends." On April 29, 1861, the Women's Central Relief Association was organized at Cooper Union, New York, under a constitution drawn up by the Rev. Dr. Henry W. Bellows, and a committee was appointed to ask for the official recognition of the association. They were kindly received, but their request for the appointment of a board with power to visit camps and hospitals and to supervise the sanitary administration according to the approved ideas of sanitary science was refused. The Government, however, consented to allow the commission to act in an advisory capacity to the medical department and to visit the camps and hospitals with a view to recommending sanitary regulations and reforms.

By an order of the War Department issued June 9, 1861, Dr. Bellows, Prof. A. D. Bache (chief of the Coast Survey), Wolcott Gibbs, M.D., Samuel G. Howe, M.D., Prof. Jeffries Wyman, M.D., W. H. Van Buren, M.D., R. C. Wood, surgeon-general U.S.A., G. W. Cullum, U.S.A., and A. Shiras, U.S.A., in conjunction with such others as might be associated with them, were constituted "a Commission of Inquiry and Advice in Respect of the Sanitary Interests of the United States Forces." They were to serve without pay, but were to be supplied with an office at Washington. The commission was charged with directing its inquiries to "the principles and practice connected with the inspection of recruits and enlisted men, the sanitary condition of volunteers, the means of preserving and restoring the health and of securing the general comfort and efficiency of the troops, the proper provision of cooks, nurses, and hospitals, and other subjects of a like nature."

The commission was organized by the election of Dr. Bellows as president and Frederick Law Olmsted as secretary. Declining Government support on the ground that it preferred to remain independent, the commission addressed itself for funds to the life insurance companies of the country and to the people at large. Responses, although generous, were at first insufficient, but in October, 1862, the outlook was brightened by the receipt of $100,000 from the people of California. Before the close of the war California had contributed more than $1,300,000. This example of generosity aroused enthusiasm and excited emulation, so that the receipts of the commission increased from $20,000 per month to more than $200,000. The total amount of cash received in the treasury of the commission during the war was $4,924,048. Next to California the largest amounts contributed by the States were: Massachusetts, $121,928; Nevada, $107,642; Oregon, $79,406; Washington (Territory), $20,918; Maine, $24,938; New York, $20,741. Even Louisiana contributed more than $3,000. Many foreign countries also aided. From London came a gift of $36,700; from Paris, $13,372; from Buenos Ayres, $18,412; from the Sandwich Islands, $17,955. Besides the actual amount turned into the treasury large sums were raised and expended by the various branches of the commission. The value of contributions other than money was estimated at $15,000,000, four-fifths of which came from local societies of which there were estimated to be more than 7,000.

The efforts of the commission were in the first place directed toward the prevention of sickness and disease among the soldiers by advising the regimental surgeons in the selection of camp sites, by regulating the drainage and by inspecting the food and supervising the cooking. To ameliorate the condition of the sick and wounded and at the same time prevent the spread of contagion, model pavilion hospitals were provided. Soldiers' homes for the sick and convalescent were established in many places to supply the deficiencies of the Government medical service. During the war thirteen such homes were maintained in the West, where more than 600,000 soldiers were lodged and 2,500,000 meals given. Hospital steamers equipped with surgeons and nurses were improvised and put on the Mississippi River and its tributaries. By this means thousands of wounded soldiers were removed with comparative comfort from the battlefields of the West to well-equipped hospitals in the North. A hospital car provided with a sort of swinging bed or hammock was invented by one of the members of the commission and was put into general use in moving wounded soldiers from the battlefields to the general hospitals. During the war 225,000 sick and wounded soldiers were transported in hospital cars from various battlefields in the East and West to the general hospitals. One of the special services of the commission was the relief which it afforded in the way of hospital supplies on the battlefield. After the battle of Antietam, when 10,000 soldiers lay wounded on the field and the trains containing the medical supplies were stalled near Baltimore, the Sanitary Commission performed some of its most valuable service. Its long wagon train had followed the army, and for several days the only available supplies were those which it furnished. In this instance the commission is said to have issued over 28,000 shirts, towels, pillows, etc.; 30 barrels of lint and bandages; over 3000 pounds of farina; over 20,000 pounds of condensed milk; 5000 pounds of beef stock and canned meats; 3000 bottles of wine and cordial; besides several tons of fruit, tea, sugar, cloth, and hospital conveniences.

The special relief service of the commission consisted in the establishment of temporary soldiers' homes at convenient depots where weak and sick men on the march could be treated and sent on to camp. Some 40 or more of these were established throughout the South. There was also a system of hospital directories organized for the purpose of keeping a record of soldiers in the hospitals so that their condition and whereabouts could be readily ascertained. The pension bureau and claim agency undertook, without charge, to aid soldiers in the prosecution of their claims by securing records or papers concerning their service and by advising such as were ignorant and incompetent. Over $2,500,000 due discharged soldiers was secured for them. The hospital inspection service consisted of a corps of physicians under an inspector in chief, who visited the general hospitals and reported to the Sanitary Commission such information as was deemed useful to the medical department. Finally the bureau of vital statistics collected a vast amount of information of permanent value relative to the health of the army, diet, influence of climate, nationality of soldiers, their physical characteristics, etc. Consult Stillé, *History of the United States Sanitary Commission* (Philadelphia, 1866).

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SANITARY LAWS. Statutes and regulations enacted under authority of the police power of the State directed to the preservation of the public health. To the first class belong quarantine laws and regulations, both foreign and domestic; statutes prescribing the requirements for the practice of medicine and surgery; ordinances prescribing rules of conduct in public places and vehicles; and provisions for tenement-house erection and inspection. To the second class belong sewer and water-supply systems; provisions for scavengers and street cleaning, meat and food inspection; ordinances prohibiting the building and maintaining of abattoirs in crowded districts; the prohibition or regulation of the manufacture and sale of unwholesome food products and adulterated drugs and provisions; the establishment of hospitals and institutions for the care of children and the insane; sanitariums for the treatment of tuberculosis and epilepsy; acts providing for the incorporation and regulation of cemeteries; the erection and support of public baths, public parks, and clean and healthful places of public amusement.

Early in the reign of Henry VIII. and later in Elizabeth's time there are indications of intelligent restriction and regulation of unhealthy trades and occupations, but these enactments gradually fell into disuse until, with the invasion of Asiatic cholera, such was the sanitary condition of English town and village life that 70,000 persons perished in a single year. The sanitary legislation that followed up to the last century was mainly ineffective, and there continued to be periodical epidemics in England, which swept away large numbers. It was not until 1848 that a general system of sanitary legislation was established in England. France and the German States had meanwhile developed systems adapted to their special methods of administration. The French system established in 1832 is characterized by councils of public health, having only advisory duties for each department, with the executory authority lodged in the prefect. The French system is generally followed by Belgium, Spain, and Italy, though Italy by its maritime cities was the pioneer in sanitary legislation during the Middle Ages. The German system is dominated by the faculties of its great medical institutions and relies for its administration upon the paternal attitude of the Government. In England and the United States sanitary laws are placed under the control of special bureaus or *boards of health*, separate provisions for this purpose being made in the Federal and State systems, the latter also delegating to municipal corporations the powers necessary to make and enforce regulations for the protection of the public health within their jurisdictions. (See HEALTH, BOARDS OF.) The diseases which require the attention of the legislator may be classified as *endemic*, *contagious*, and *epidemic*. (See CONTAGIOUS DISEASES; ENDEMIC; EPIDEMIC.) Boards of health are not liable for errors of judgment when acting within their jurisdiction, though they are liable for negligence. Yet a city or municipality cannot be held responsible for the negligence of a physician of the board, the mismanagement of its hospital, or even the wrongful appropriation of property by members of the board of health, for the purpose for which the board is created is governmental in character and the municipality derives no benefit in its corporate capacity from the performance of this duty.

See POLICE POWER; QUARANTINE; NUISANCE, etc.; and consult the authorities mentioned there; also Lumley, *Public Health* (5th ed., London, 1896); Stockman, *A Practical Guide for Sanitary Inspectors* (ib., 1900).

SANITARY SCIENCE. The subdivision of hygiene which treats of ascertained facts and verified theories concerning preservation of health, prevention of disease, and prolongation of life. The subject naturally subdivides into the following principal topics: (1) Those which concern the surroundings of man, such as the site or soil on which his dwelling is placed; the air he breathes; the water he drinks; the character, materials, and arrangements of his dwelling; the cleaning, warming, and ventilation of his dwelling, and the arrangements for the removal from it of excreta; and the general problem of disposal of sewage. (2) The prevention of disease. (3) The personal care of health, covering such points as diet, exercise, and clothing.

SOIL. Soils may be moist or dry, permeable or impermeable, flat or sloping, etc. Their characteristics depend, aside from topography, upon the predominance of organic or inorganic constituents, water, and air. Loam contains much organic matter, many earthworms and innumerable bacteria. Deep soil is rarely contaminated with excrementitious matter. At a certain level, dependent upon the position of strata of clay and gravel, is a subterranean collection of water known as 'ground water.' It represents the moisture that permeates the surface soil after that is saturated and reaches an impermeable soil upon which it firmly lies, and from whence it is pumped or raised in wells. This subterranean sea is constantly in motion, vertically and horizontally. Its horizontal motion is toward the sea or the nearest watercourse. Its vertical motion is determined chiefly by rainfall. Much importance has been attached to it, and the following points may be considered as accepted: (1) A permanently high ground water, that is, within 5 feet of the surface, is bad, while a permanently low ground water, that is, more than 15 feet from the surface, is good; and (2) violent fluctuations are bad, even with an average low ground water; a comparatively high ground water with moderate and slow fluctuations may be healthful. The ground water determines the spread of certain forms of disease. The rainwater, in the act of passing through the upper strata of earth, carries with it a mass of organic matter as well as a host of bacteria and disease germs, of which it is robbed as it sinks to the deepest soil. If well-water be augmented by ground water which leaches in at high level it will be contaminated and polluted. Healthy soils are the granites, metamorphic rocks, clay slate, limestone, sandstone, chalk, gravel, and sand; unhealthy are clay, sand and gravel with clay subsoil, alluvial soil, and marsh-lands. Among the unhealthy soils ought also to be included all 'made' soils, particularly those that are formed so often in towns from rubbish of all sorts. Such soils ought not to be occupied as building sites for at least two years.

SITES. The proper site for a dwelling is upon a permeable, porous soil, through which rain may easily filter and into which it may carry or-

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ganic matter from the surface; a soil which has a low ground-water level, and which retains but little dampness; a soil which admits of free circulation of atmospheric air with the ground air; a soil that does not admit of collections of standing water, and that has slope enough to insure drainage. Where soil cannot be selected paving and tree-planting correct many evils. Paving prevents the diffusion of ground air and the entrance of sewage or contaminated rainwater. Trees absorb carbonic acid gas and moisture and yield oxygen, which in turn assists chemical conversion of organic matter. Cementing of cellars and laying damp-proof material upon foundations before erecting walls are also protective measures against dampness and pollution. In wet localities or in settlements necessarily built for commercial reasons near marshy land, through subsoil drainage by means of trenches or drain-tile, the level of the ground water may be lowered to a safe position. See DRAINAGE.

AIR. Air is an imperfect gas consisting of 79 per cent. of nitrogen and nearly 21 per cent. of oxygen, together with small quantities of carbonic acid, ammonia, watery vapor, and impurities. We may neglect the consideration of the small quantities of helium, neon, argon, krypton, and xenon, the rare gases found in the atmosphere during recent chemical investigations. Air is the prime requisite for existence, and upon its purity depends to a large extent the growth, development, and health of animal life. Saturation of the atmosphere with water is called 100 per cent. of humidity. Average health demands a humidity of from 65 to 75 per cent., the lowest amount of aqueous vapor in the air being 35 per cent. Impurities in the air are from various sources. Air is vitiated by respiration, combustion of fuel or of illuminating gas, decaying vegetable or animal matter, and by gases arising from manufacturing and various occupations. Expired air contains 100 times more carbonic acid and nearly 5 per cent. less oxygen than ordinary atmospheric air. Emitting with each expiration 22 cubic inches of air and respiring 18 times a minute, each adult emits 570,240 cubic inches, or 330 cubic feet of air in 24 hours. In this total there are 14.52 cubic feet of carbon dioxide. Physical activity increases this total. Combustion of fuel and gas adds carbon monoxide and dioxide, smoke, and soot to the atmosphere. Factories, etc., add dust, chemical vapors, and volatile substances to the air. Small amounts of impurity do a little damage to health, large amounts undermine it. Hence ventilation becomes necessary, that is, comparatively pure air must be substituted in dwellings for vitiated atmosphere. See HEATING AND VENTILATION.

WATER. The atmosphere is the source of water supply. The vapor of water therein is condensed and falls in the form of rain, snow, or dew. Rain, obviously, must carry down with it the impurities in the atmosphere—gases, dust, and bacteria. It must cause deeper deposition of organic matter as it passes into the soil. It becomes either surface water augmenting the streams, or ground water supplying wells and subterranean reservoirs. Impure water carries the germs of many diseases, as typhoid fever, diphtheria, diarrhœa, dysentery, malaria, cholera, probably yellow fever, etc. The pollution of surface water by the entrance of sewage and of decomposing organic matter is very easy and is a prevalent cause of disease. See FILTER AND FILTRATION; also WATER PURIFICATION; WATER SUPPLY; WATER-WORKS.

DWELLINGS. Besides the site of a dwelling and the desirability of its freedom from dampness and ground air, to which attention has already been given, a house for living or for business purposes should give access to an abundance of sunlight. The heat rays, luminous rays, and actinic rays of light all effect decomposition of organic material and hasten reconstruction processes. The materials of which houses are built are various. Wooden dwellings are common in country localities, but they are always open to the objection of the greater danger of fire. In cities brick or stone is most commonly used, but very good dwellings may be made of concrete. Probably the best material is good, sound, well-burnt brick. Dryness must be secured by means of damp-proof courses along the foundations and hollow walls, and cementing externally. Non-absorbent surfaces internally are important, although some have been inclined to attribute the unhealthfulness of dwellings to the impermeability of the walls obstructing air change. But where air can pass organic matter can lodge and becomes a source of danger. It is better, therefore, to have non-absorbent surfaces as much as possible, and to provide for ventilation in other ways. Paint that can be washed is therefore better than paper. Care should be taken to scrape off all old papers beneath, as they and the paste used with them tend to decompose and become injurious to health. Ceilings ought to be impervious as well as walls, and floors ought to be made of well-fitting seasoned wood, calked and oiled or varnished so as to make them water-tight. The proper cubic space has been stated. Arrangements should be made for change of air once in three hours, if conditions of constant change do not exist. The furniture of rooms, especially sleeping rooms, ought not to be too massive; white curtains and hangings too often form traps for dust and organic matter. The warming of houses is of exceeding importance. See HEATING AND VENTILATION.

Scrupulous attention to cleanliness is necessary in dwellings, and there is wisdom in the use of rugs or loose carpets which may be removed daily from rooms and thoroughly cleaned. Corners should be thoroughly freed from dust as well as nooks underneath and behind large pieces of furniture, spaces above rows of books, the wall sides of pictures, etc., for dust forms a well-adapted nidus for disease germs, especially of the bacteria which produce suppuration. Closely allied to the ordinary cleaning of the interior of dwellings is the problem of the removal of excreta, waste, and garbage. Practically waste consists of: (1) Garbage, including kitchen refuse, offal, bones, etc.; (2) refuse, including paper, dust, ashes, clothing, carpet, broken furniture, iron and other waste metal, as well as 'trade refuse,' which includes excelsior, straw, wood shavings, leather scraps, tobacco stalks, felt cuttings, tin scraps, etc.; and (3) sewage, including animal excrement (fæcal and urinary), wash water from bathing, laundering clothes, washing culinary utensils, cleaning house, etc. Properly separated, ashes and dust are useful in filling sunken lots, marshes, etc. Paper, metal, and most trade refuse have a market value. Sewage and garbage are valuable fer-

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tilizers. Yet in most cities all the waste is either burned and destroyed or freighted out and dumped into the sea or some large body of water. It was calculated by a former street-cleaning commissioner in the old city of New York (now the Borough of Manhattan) that the dry refuse reached the aggregate of 1,000,000 tons annually and the garbage 175,000 tons annually. The value of the salvable part of this great mass of waste was stated to be over $650,000 a year. Sanitation is concerned with the disposal of garbage. See GARBAGE AND REFUSE DISPOSAL; SEWAGE DISPOSAL; PLUMBING.

PREVENTION OF DISEASE. This is a large question, on which this article can only briefly touch. Much depends upon knowledge of the ætiology or the remote causes of disease. The best rule for preventing disease is to follow out carefully the principles of general hygiene (q.v.) with reference to pure air, pure water, proper food, cleanliness, etc. Provision may be made against certain diseases. Malaria (q.v.) may be prevented by destroying mosquitoes and depriving them of their breeding places, as well as by screening doors and windows of houses in malarious districts. Smallpox may be prevented by persistent revaccination. (See VACCINATION.) Typhoid fever may be prevented by boiling all water before it is drunk or used in cooking, by cooking oysters thoroughly, by most scrupulous drenching of all raw vegetables which may have been watered with liquid manure, and by preventing insects from gaining access to typhoid patient's dejecta or clothing before thorough disinfection has been practiced. (For the diseases transmitted through the agency of insects most of them preventable, see INSECTS, PROPAGATION OF DISEASE BY.) In most large cities compulsory notification to the Board of Health is legal in the case of cholera, yellow fever, plague, smallpox, chicken-pox, diphtheria (including membranous croup), typhus, typhoid, tuberculosis, measles, and spotted, relapsing, and scarlet fevers, all of which are considered contagious except typhoid. Isolation is practiced in all these diseases, partial or absolute. Much stress has been laid upon *disinfection* as a means of preventing disease, and if properly carried out it has some efficiency. But it is a mistake to place too implicit reliance upon it as ordinarily practiced. See DISINFECTANTS.

THE DISPOSAL OF THE DEAD. In order to understand the importance of this subject one must know something of the changes which the body undergoes after death. A body that has been buried gradually breaks up into a large number of comparatively simple compounds, such as carbonic acid, ammonia, sulphureted and carbureted hydrogen, nitrous and nitric acid, and certain more complicated gaseous matters with a very fetid odor, which finally undergo oxidation; while the non-volatile substances usually enter into the soil, and either pass into plants or are carried away by the water percolating the soil. These changes are accelerated by the worms and other low forms of life that usually swarm in decomposing bodies; and the character of the soil materially influences the degree of rapidity of destruction. The bones remain almost unchanged for ages. If a body is burned, decomposition is incomparably more rapid, and different volatile combinations may arise, the mineral salts and a little carbon alone remaining. Putting aside the visionary schemes for turning the dead to commercial account, there are three methods of disposing of our dead for consideration, viz. burial in land or in water, or cremation. At present the question is not urgent; but it may become so in a century or two, if the population continues to increase at the present rate. Even in our own time a great change has taken place, and the objectionable habit of interments in and around churches in towns has been abandoned, cemeteries in the country being now commonly employed, except in the case of country villages. The air over cemeteries is, however, always contaminated, and water percolating through them is unfit for drinking purposes. The evils are lessened by making the grave as deep as possible, and by placing not more than one body in one grave. Plants should be freely introduced into every cemetery, for the absorption of organic matters and of carbonic acid; and the most rapidly growing trees and shrubs should be selected, in preference to the slowly growing cypress and yew. The superficial space which should be allotted to each grave varies in different countries from 30 to 90 feet; the depth should be at least 6 feet. It is required by law that the grave spaces for persons above twelve years of age shall be at least 9 feet by 4, and those for children under twelve years, 6 feet by 3. It is likewise required that not less than 4 feet of earth should be placed over the coffin of an adult, and 3 feet above that of a child. The time which should elapse before a grave is disturbed for a new tenant varies with the soil and the distance of the body from the surface. Under favorable circumstances, a coffin containing an adult will disappear with its contents in about ten years; while in a clayey or peaty soil it will remain a century. It is generally assumed that a period of fourteen years is sufficient for the decay of an adult, but long before this time all will have disappeared but the skeleton. As a matter of expense, too, that of cremation is greater than burial at sea. In burial at sea the body would go at once to support other forms of life more rapidly than in the case of land burial, and without danger of evolution of hurtful products. See BURIAL; CREMATION.

DIET. Although about seventy elementary substances are known to chemists, only a comparatively small number of these take part in the formation of man and other animals; and it is only this small number of constituents which are essential elements of our food. These elements are, in the order of their abundance, oxygen, carbon, hydrogen, nitrogen, calcium, phosphorus, chlorin, fluorin, sulphur, potassium, sodium, magnesia, and iron, with traces of silicon, lithium, and manganese.

Carbon, hydrogen, nitrogen, and oxygen are supplied to the system by the proteid group of alimentary principles (see DIET)—viz. albumen, fibrin, and casein, which occur both in the animal and vegetable kingdoms, and the gluten contained in vegetables. Animal flesh, eggs, milk, corn, and many other vegetable products contain one or more of these principles. The gelatinoid group also introduces the same elements into the system, when such substances as preparations of gelatin, calves' feet, etc., are taken as food. Carbon, hydrogen, and oxygen are abundantly introduced into the system of the carbohydrate group in the form of sugar or starch (which occur in

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large quantity in the cereal grains, leguminous seeds, roots, tubers, etc., used as food), and also by organic acids (which, as citric, malic, tartaric acid, etc., occur in numerous vegetables employed as food). Carbon, with hydrogen and oxygen, occurs abundantly in the fatty group of alimentary principles, as, for instance, in all the fat, suet, butter, and oil that are eaten; in the oily seeds, as nuts, walnuts, cocoanuts, etc.; and in fatty foods, as liver, brain, etc. Phosphorus is supplied to us by the flesh, blood, and bones used as food, and in the form of various phosphates it is a constituent of many of the vegetables used as food. The system derives its sulphur from the fibrin of flesh, the albumen of eggs, and the casein of milk, from the vegetable fibrin of corn, etc., from the vegetable albumen of turnips, cauliflowers, asparagus, etc., and from the vegetable casein of peas and beans. Most of the culinary vegetables contain it. Chlorine and sodium, in the form of chloride of sodium, are more or less abundantly contained in all varieties of animal food, and are taken separately as common salt. Potassium is a constitutent of both animal and vegetable food; it occurs in considerable quantity in milk, and in the juice that permeates animal flesh; and most inland plants contain it. We derive the calcium of our system from flesh, bones, eggs, milk, etc. (all of which contain salts of lime); most vegetables also contain lime-salts; and another source of our calcium is common water, which usually contains both bicarbonate and sulphate of lime. Magnesium in small quantity is generally found in those foods that contain calcium. Iron is a constituent of blood found in meat; and it occurs in smaller quantity in milk, in the yolk of egg, and in traces in most vegetable foods. Fluorin occurs in minute quantity in the bones and teeth, obtained from the traces of fluorin found in milk, blood, etc.

These simple bodies are not, however, capable of being assimilated and converted into tissue in the animal body; this combination is effected in the vegetable kingdom, and animals modify and convert the complex compounds which they obtain from vegetables. The number of combined elements varies: thus water contains only 2; sugar, starch, fat, and many organic acids contain 3; while casein, fibrin, and albumen, exclusive of the mineral salts in their ash, contain 5.

It would be impossible, and it is quite unnecessary, to mention in this article the different animals and plants that are used as food by different nations. The interested are referred to Reich's *Nahrungs- und Genussmittelkunde* (1860-61).

DRINKS are merely liquid foods. They include: Mucilaginous, farinaceous, or saccharine drinks—as toast-water, barley-water, gruel, etc., which are very slightly nutritive, and differ but little from common water; aromatic or astringent drinks—as tea, coffee, chocolate, and cocoa, the last two of which contain a considerable quantity of oil and starch; acidulous drinks—as lemonade, ginger beer, raspberry-vinegar water; drinks containing gelatin—the broths and soups, which, if properly prepared, should contain all the soluble constitutents of their ingredients; emulsive or milky drinks—as animal milk, the milk of the cocoanut, and almond milk, a drink prepared from sweet almonds (animal milk contains all the essential ingredients of food, the others are slightly nutritive); alcoholic and other intoxicating drinks—including malt liquor or beer in its various forms of ale, stout, and porter; wines; spirits in their various forms of brandy, rum, gin, whisky. Whether alcoholic drinks constitute food is debatable.

Excluding salt, which must be considered as a saline alimentary principle, the most common condiments, such as mustard, capsicum (Cayenne pepper), pepper, the various spices, etc., owe their action to the presence of a volatile oil. Condiments and sauces afford little or no nutrition. They do, however, exert special action on the nervous system to stimulate secretion and also to retard tissue change and waste. Any more than a very moderate use is likely to impair the digestion and nutritive processes. Salt has a special value in promoting diffusion through the animal membranes and in bringing some of the alimentary principles into solution. Its decomposition probably furnishes the hydrochloric acid to the gastric juice. (For a general discussion of the preparation of foods, see COOKERY; and in this connection see, also, ADULTERATION and FOOD.) Salted meat is, in so far as nutrition is concerned, in much the same state as meat from which good soup has been made. After flesh has been rubbed and sprinkled with dry salt, a brine is formed amounting in bulk to one-third of the fluid contained in the raw flesh. This brine is found to contain a large quantity of albumen, soluble phosphates, lactic acid, potash salts, creatin, and creatinin—substances which are essential to the constitution of the flesh, which therefore loses in nutritive value in proportion to their abstraction. For a discussion of the preservation of food, see ANTISEPTICS; FOOD; AND FOOD, PRESERVATION OF.

The method of refrigeration is, on a small scale, familiar to every one by the use of ice in the ordinary household refrigerator. (See REFRIGERATION.) The method of drying—evaporation of water by sun heat or in ovens—is largely applied to meats and to fruits and vegetables. Foodstuffs so treated reabsorb moisture and deteriorate after a time. Certain fruits, as raisins, figs, and dates, are very palatable after such treatment. The method of exclusion of air, sometimes called Appert's method, from its inventor (François Appert, q.v.), is applied to every kind of perishable food, and constitutes one of the great industries of the world. It consists in subjecting the article to be preserved to a temperature sufficient to destroy the germs which cause decomposition, and then putting it into tins or jars, which are immediately made air-tight. This principle is applied in the familiar 'canning' of vegetables and fruits. Certain special devices of limited application are resorted to, as the exclusion of air by means of oils and fats and varnishes, or a layer of paraffin.

The method of antiseptics finds application chiefly in the use of smoke, sugar, salt, alcohol, vinegar, and saltpetre.

The pecuniary economy of various foods has been the subject of much investigation in Europe and in the United States. Protein is an essential food, since from no other source can the animal obtain nitrogen; it is also much the costliest form of food. The ratios used by Atwater are 5.3 and 1 for the relative cost of protein fats and carbohydrates. It is, therefore, important

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economically to obtain protein in its cheapest form, and to use no more than is sufficient for the requisite nitrogen and then to use carbohydrates (starches, etc.) in preference to fats for carbon and hydrogen. Oatmeal, beans, potatoes, and wheat flour are among the cheapest foods, considering their nutritive value, as oysters, salmon, and lobsters are among the costliest. See FOOD.

EXERCISE. The most important effect of muscular exercise is produced on the lungs, the quantities of inspired air and of exhaled carbonic acid being very much increased. Taking the air inspired in a given time in the horizontal position as unity, a man walking 3 miles per hour inspires 3.22; and if carrying 34 pounds, 3.5; a man walking 4 miles per hour inspires 5; and when walking 6 miles per hour no less than 7. Almost twice as much carbonic acid is exhaled during exercise as during rest. Hence, muscular exercise is necessary for the due removal of the carbon. The effect of exercise on the mind is not clearly determined; great bodily activity is often observed in association with full mental activity; and better intellectual work can be done by one who exercises physically daily. *Digestion* is improved by exercise. The appetite increases, and nitrogenous substances, fats, and salts, especially phosphates and chlorides, are required in greater quantity than in a state of rest. The *change of tissues* is increased by exercise, or, in other words, the excretions give off increased quantities of carbon, nitrogen, water, and salts. The muscles require much rest for their reparation after exercise, and they then absorb and retain water, which seems to enter into their composition. So completely is the water retained in the muscles that the urine is not increased for some hours. The old rule, held by trainers, of only allowing the smallest possible quantity of fluid, is wrong. See EXERCISE; GYMNASTICS; PHYSICAL TRAINING.

CLOTHING. The object of clothing is to preserve the proper heat of the body by protecting it from both cold and heat, and thus to prevent the injurious action of sudden changes of temperature upon the skin. The most important materials of clothing are cotton, linen, wool, silk, leather, and india-rubber. *Cotton*, as a material of dress, wears well, does not rapidly absorb water, and conducts heat much less rapidly than linen, but much more rapidly than wool. From the hardness of its fibres, its surface is slightly rough, and occasionally irritates a very delicate skin. Its main advantages are cheapness and durability. In merino it is mixed with wool in various proportions, and this admixture is far preferable to unmixed cotton. *Linen* is finer in its fibres than cotton, and hence is smoother. It possesses high conducting and bad radiating powers, so that it feels cold to the skin; moreover, it attracts moisture much more than cotton. For these reasons, cottons and thin woolens are much preferred to linen garments in warm climates. *Silk* forms an excellent underclothing, but, from its expense, it can never come into general use. *Wool* is superior both to cotton and linen in being a bad conductor of heat, and a great absorber of water, which penetrates into the fibres and distends them (hydroscopic water), and also lies between them (water of interposition). During perspiration, the evaporation from the surface of the body is necessary to reduce the heat which is generated by exercise. When the exercise is concluded, evaporation goes on, and to such an extent as to chill the body. When dry woolen clothing is put on after exertion, the vapor from the surface of the body is condensed on the wool, and gives out again the large amount of heat which had become latent when the water was vaporized. Therefore, a woolen covering, from this cause alone, at once feels warm when used during sweating. In the case of cotton and linen, the perspiration passes through them, and evaporates from the external surface without condensation; the loss of heat then continues. These facts make it plain why dry woolen clothes are so useful after exertion. In addition to this, the texture of the wool is warmer, from its bad conducting power, and it is less easily penetrated by cold wind. *India-rubber* clothing must be used with caution. From its being impervious to air, and from its condensing and retaining perspiration, it is decidedly objectionable; while, on the other hand, its protection against rain is a very valuable property.

In relation to protection against heat, we have to consider the color and not the texture of clothing. White is the best color, then gray, yellow, pink, blue, and black.

The shape and weight of all articles of clothing should be such as to allow of the freest action of the limbs, and in no way to interfere by pressure with the processes of respiration, circulation, and digestion.

PERSONAL CLEANLINESS. Attention to the state of the skin is of great importance in a hygienic point of view. The perspiration and sebaceous matters which are naturally poured out upon the surface of the body, with an intermingling of particles of detached epidermis, fragments of fibres from the dress, dirt, etc., if not removed, gradually form a crust which soon materially interferes with the due excreting action of the skin. There is little doubt that the daily use of the cold sponge-bath, which less than half a century ago was unknown, and is now a matter of necessity with most healthy persons who have the means of using it, has contributed materially to the preservation of health and the prevention of catarrhal attacks.

Consult: Robinson, *Sewage Disposal* (London, 1882); Richardson, *The Field of Disease: A Book of Preventive Medicine* (ib., 1883); Waring, *How to Drain a House* (New York, 1885), and *The Disposal of Sewage and the Protection of Streams Used as Sources of Water Supply* (Philadelphia, 1886); Plunkett, *Women, Plumbers, and Doctors* (New York, 1885); Wilson, *Handbook of Hygiene and Sanitary Science* (Philadelphia, 8th ed., 1892); Roechling, *Sewer Gas and Its Influence Upon Health* (London, 1898); Reid, *Practical Sanitation* (ib., 1901); Baker, *Municipal Engineering and Sanitation* (New York, 1902); Sedgwick, *Principles of Sanitary Science and the Public Health* (ib., 1902); Chapin, *Municipal Sanitation in the United States*.

SAN JACINTO, BATTLE OF. The final battle in the war for Texan independence, fought near San Jacinto Bay, Texas, April 21, 1836, between about 740 Texans, under General Houston, and about 1400 Mexicans, under Santa Anna. On April 20th the opposing forces took up positions about one mile apart, and after some preliminary skirmishing the battle took place on the afternoon of the following day. It was hardly more than a sharp charge by the Texans, who

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rushed on with the cry "Remember the Alamo," and quickly overcame the Mexicans. Santa Anna fled, but was afterwards captured. The Texans lost only about 30 in killed and wounded; the Mexicans, 1360 in killed, wounded, and captured.

SAN JOAQUIN, hō'ä-kēn'. A town of Panay, Philippines, in the Province of Iloilo, situated on the coast, about 30 miles southwest of Iloilo (Map: Philippine Islands, G 9). Population estimated, in 1899, at 13,918.

SAN JOAQUIN. A river of California, draining the southern half of the great central valley between the Coast Range and the Sierra Nevada (Map: California, C 3). It rises in the latter range and flows first southwest to its junction with the intermittent outlet of Tulare Lake, then northwest till it unites with the Sacramento River and enters the Bay of San Francisco, whence its waters flow through the Golden Gate to the Pacific Ocean. The length of the river is about 350 miles. It receives numerous tributaries from the mountains on either side, one of which, the Merced, flows through the famous Yosemite Valley. The San Joaquin is navigable at all seasons to Stockton, 50 miles.

SANJO SANÉYOSHI, sän'jō' sä-nā'yō-shē (1836-91). A Japanese statesman, born at Kioto of the Fujiwara princely family. He was originally anti-foreign, and in 1863 he was sent by the Mikado to Yedo to demand reform and more vigorous government. The Shogun's party in Kioto triumphing, Sanjo and six other nobles fled to Choshiu. After three years' exile, having become converted to liberal views, he returned to Kioto, was made vice-administrator and junior Prime Minister, and in 1870 Premier, an office which he held until 1886, when he was made Chancellor.

SAN JOSÉ, hō-sā'. The capital of Costa Rica, situated 44 miles east of Puntarenas, on the Pacific coast, and 68 miles west of Limón, on the Atlantic coast (Map: Central America, E 6). It is regularly built, with broad macadamized streets crossing at right angles, and all lighted by electric incandescent lamps. There are several fine squares containing park-like gardens. The most prominent buildings and institutions are the cathedral, the National Museum, the school of law, a seminary, the National Library, and the Institute of Physical Geography. The elevation of the town above the sea is 3868 feet. It has a temperate climate and a good water supply. It is the centre of a rich agricultural region, and the principal station on the transcontinental railroad from Limón to Puntarenas. Population, in 1897, 25,000. San José was founded in 1738 and became the capital of Costa Rica on the establishment of independence in 1823.

SAN JOSÉ. The principal seaport on the Pacific Coast of Guatemala, situated 54 miles southwest of the city of Guatemala, with which it is connected by rail (Map: Central America, B 4). The harbor is provided with an iron pier, and is a station for several lines of steamers. The town exports coffee, sugar, cotton, dyestuffs, and lumber.

SAN JOSÉ. A town of Luzon, in the Province of Batangas, Philippine Islands. It lies 7 miles north of Batangas on the projected Manila-Batangas Railroad. Population, 10,000.

SAN JOSÉ, sän hō-sā', *or, colloquially,* sän ō-zā'. The county-seat of Santa Clara County, Cal., 50 miles south by east of San Francisco, on the Southern Pacific and the Central Pacific railroads (Map: California, C 3). It is situated in the beautiful Santa Clara Valley, and is a popular health resort. San José is the seat of the University of the Pacific (Methodist Episcopal), with handsome buildings and a campus covering 17 acres; the College of Notre Dame, a Roman Catholic institution, opened in 1851; and a State Normal School. Noteworthy also are the city hall, court house and hall of records, the post office building, and the high school building. The city has a public library and the San José Library. There are two parks—Saint James and the City Hall Park. Alum Rock Park, 7 miles distant, with its mineral springs and picturesque scenery, and the Lick Observatory (q.v.), on the summit of Mount Hamilton, 18 miles to the east, attract many vistors. San José is the centre of the Santa Clara Valley, which produces large quantities of prunes, apricots, peaches, cherries, grapes, olives, wheat, and barley. It is an important fruit packing and shipping point, and also ranks high industrially. In the census year 1900 the various industries had an invested capital of $3,534,136, and a production valued at $4,584,072. There are foundries, fruit canning and drying establishments, marble works, and manufactories of wine and malt liquors, leather, windmills, etc. The government, under the revised charter of 1897, is vested in a mayor, elected every two years, and a unicameral council. Population, in 1890, 18,060; in 1900, 21,500. The Pueblo de San José de Guadalupe was founded here in 1777, and the Mission of San José was established near by in 1797. In 1846 a small force took possession for the United States, and from 1849 to 1851 San José was the capital of California. Consult: Hall, *History of San José and Surroundings* (San Francisco, 1871); Mars, *Reminiscences of Santa Clara Valley and San José* (ib., 1901).

SAN JOSÉ DE BUENAVISTA, sän hō-sā' dā bwā'nä-vēs'tä. The capital of the Province of Antique, in Panay, Philippines (Map: Philippine Islands, F 9). It is on the coast in the southern part of the province, is a port of entry, and has an active coasting trade with Iloilo. Population, estimated, in 1899, 5621.

SAN JOSÉ DE CÚCUTA, kōō'kōō-tä, or simply CÚCUTA. A town in the Department of Santander, Colombia, situated on the Tachira, near the Venezuelan frontier (Map: Colombia, C 2). Since the earthquake which destroyed the town in 1875 it has been reconstructed with broad clean streets and a large square. It is a centre of trade between Santander and Venezuela, and is the terminus of a railroad to Puerto Villamizar. Population, 13,000.

SAN JOSÉ SCALE. An hemipterous insect (*Aspidiotus perniciosus*) of the family Coccidæ. (See SCALE-INSECT.) It derives its popular name from San José, California, where Comstock discovered and named it in 1880. It has been considered the most pernicious scale-insect in the United States, whence the specific name. It was probably introduced at San José about 1870 on trees imported from China by James Lick. By 1890 it had spread over the greater part of California, but was not recognized east of the Rocky Moun-

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tains until August, 1893, when it was found by Howard on a pear received from Charlottesville, Virginia. Soon afterwards the discovery was made that in 1887 or 1888 infested nursery stock had been brought from California by two New Jersey nurseries and that unwittingly nursery infested stock had been sent out broadcast. By 1895 the pest had become established in many nurseries and orchards in the majority of the Eastern States, and in February, 1898, the German Government prohibited the importation of American fruits and plants, to prevent the introduction of the scale. Other European governments, Canada, and South Africa soon after issued similar decrees. It is now known in Japan, China, and Australia, and in almost every one of the United States, seeming to reach its greatest powers of destruction in the best fruit-growing regions.

The San José scale does not occur upon citrus fruits, but has attacked the limbs, leaves, and fruit of more than 150 species of food plants, including the principal deciduous fruit and ornamental trees and shrubs. When the infestation is very bad, the scales lie close together upon the bark, frequently overlapping, the young scales clustering over the surface of the older individuals. The general appearance of a twig covered with the scales is of a grayish, slightly roughened, scurfy deposit. Infested apple and pear fruits show a reddish discoloration of the skin, and when severely attacked, become distorted, rough, pitted, and frequently cracked. Well-grown apple trees are resistant for several years, but young peach trees are often killed in two seasons. The money lost to the orchard interest of the United States from the work of this insect has been enormous.

The winter is passed by the nearly full-grown insects under the protection of the scale. In the early spring the hibernating males emerge, and in May the females mature and begin to give birth to young, at the daily rate of perhaps nine to ten young by each mother for a period of six weeks. It is estimated that the offspring during a summer from a single over-wintering female may amount to more than one and one-half billions. Distribution is mainly by means of nursery stock, but is also upon fruit. The young are also carried upon the feet of birds and flying insects. Wind also has some effect on the distribution. None of the native national enemies appear to be very effective, although a chalcidid fly (*Aphelinus fuscipennis*) destroys the adults. The Chinese ladybird (*Chilocorus similis*), introduced by Marlatt, may prove a more effective natural enemy. See LADYBIRD.

The principal remedies in use are treatment with a mixture of lime, sulphur, and salt, known as 'California wash,' with whale-oil or fish-oil soap, preferably made with potash lye; with a kerosene-soap emulsion, or with crude petroleum; with a mechanical mixture of kerosene and water; and with hydrocyanic acid gas. The last-named treatment is now used only for nursery stock, although extensive experiments have been made with orchard trees.

Consult: Howard and Marlatt, *Bulletin No. 3, new series, Division of Entomology, United States Department of Agriculture* (Washington, 1896); Marlatt, *Circular No. 42, second series* (ib., 1902); Johnson, *Fumigation Methods* (New York, 1902); *Bulletins* of agricultural experiment stations.

SAN JUAN, HWÄN. A western province of Argentina, bounded by Chile on the west, the Argentine Province of La Rioja on the north and east, and the provinces of San Luis and Mendoza on the south (Map: Argentina, D 10). Area, 33,715 square miles. It is traversed in the west by a number of parallel mountain chains belonging to the Andes, and inclosing fertile valleys. The eastern portion is level and covered for a large part by a saline steppe and arid tracts. Gold and silver are mined to some extent and other minerals are believed to exist in large quantities. Agriculture and cattle-raising are the chief occupations. Besides wheat and corn large quantities of lucerne are raised, and wine and olives are also extensively cultivated. The chief exports are wine and cattle. Population, in 1900, 94,991. The capital is San Juan.

SAN JUAN. The capital of the Province of San Juan, Argentina, situated on the San Juan River, 85 miles north of Mendoza, with which it has railroad connection (Map: Argentina, D 10). It has been called an 'oasis of civilization,' and is a clean and well-built town, well paved and drained, and provided with public baths. It has a national college, a normal school, and a large seminary. The wine trade is important, and the town exports cattle to Chile. Population, in 1895, 10,410; estimated in 1898 at 12,000.

SAN JUAN. A town of Luzon, Philippines, in the Province of La Unión, situated on the coast, three miles north of San Fernando (Map: Philippine Islands, E 3). Population, estimated, in 1899, 10,211.

SAN JUAN (full name SAN JUAN BAUTISTA DE PUERTO RICO). The capital of Porto Rico, situated on a small coral island toward the eastern end of the north coast (Map: Porto Rico, C 2). The islet is about 2½ miles long, and half a mile wide, and is connected with the mainland by the Bridge of San Antonio. The bay inclosed by it is spacious and deep, and forms the best harbor of the island, though the narrow, rocky entrance is dangerous in stormy weather. The town is surrounded by picturesque walls, and toward the sea presents a line of fortified cliffs. On a promontory at the western end stands the Morro Castle, built in 1584, but well preserved. The streets are laid out in regular squares, and are well paved and shaded.

On the Plaza de Santiago stands a statue of Ponce de Leon. There are a number of fine buildings, such as the city hall, the custom-house, the former Captain-General's palace, the barracks, and the Casa Blanca, an interesting fortress-like building said to have been built by Ponce de Leon. There are also a cathedral and an immense Dominican convent. The water supply and sanitary arrangements are defective. Industrially and commercially the city is not very important. The population of the municipal district in 1899 was 32,048. San Juan was founded in 1511 by Ponce de Leon. It was strongly fortified and several times repulsed the attacks of English fleets. On May 12, 1898, during the Spanish-American War, its defenses were bombarded by the American fleet under Sampson, but the city was not occupied by the American forces until after the suspension of hostilities.

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SAN JUAN BAUTISTA, bou-tēs'tä. The capital of the State of Tabasco, Mexico, situated on the Grijalva, about 30 miles from the coast (Map: Mexico, N 8). It stands in a low and unhealthful locality and is of unpretentious appearance. It has some trade through its port, Frontera, at the mouth of the river. It was founded under the name *Villa Felipe II.* in 1598, afterwards called *Villa Hermosa,* and finally in 1821 was given its present name. Population, in 1895, 9604.

SAN JUAN BOUNDARY DISPUTE. A dispute between the United States and Great Britain in regard to a part of the Oregon boundary, which by the treaty of June 15, 1846, was made the forty-ninth parallel to the "middle of the channel which separates the continent from Vancouver Island, and thence southerly through the middle of said channel and of Fuca Straits, to the Pacific Ocean." Afterwards a difference of opinion arose between the two countries as to what 'channel' was meant; the United States maintaining that it was the Canal de Haro, and Great Britain that it was Rosario Strait, so that it remained unsettled to which government Washington Sound and the islands in it belonged. An amicable arrangement was effected in 1859, by which the two governments jointly occupied the island, the United States having a garrison in the south and Great Britain in the north. The Treaty of Washington (1871), art. 34, referred the controversy to the Emperor of Germany, who decided for the United States in 1872.

SAN JUAN DE BOCBOC, bŏk-bŏk'. A town of Luzon, Philippines, in the Province of Batangas. It is situated on the Gulf of Tayabas, 25 miles east of Batangas (Map: Philippine Islands, F 6). Population, estimated, in 1899, 14,017.

SAN JUAN DE LA CIÉNEGA, sē-ä'nā-gä. See CIÉNEGA.

SAN JUAN DEL MEZQUITAL, dĕl mĕs'kē-täl'. A Mexican town of the State of Zacatecas, 90 miles northwest of the city of that name (Map: Mexico, G 5). Population, in 1895, 7113.

SAN JUAN DEL NORTE, nôr'tä, or GREYTOWN. The principal seaport on the Atlantic coast of Nicaragua, at the mouth of the northern arm of the San Juan River delta, in the extreme southeastern corner of the Republic (Map: Central America, F 5). A mile north of the town is the village of America, the eastern terminus of the proposed Nicaragua Canal (q.v.). Greytown lies in an unhealthful locality. Its harbor is rapidly filling with sand, but jetties have been constructed to remedy the evil. Population, about 2500.

SAN JUAN DE LOS REMEDIOS, rä-mä'dē-ōs. See REMEDIOS.

SAN JUAN DEL RIO, dĕl rē'ō. A town of Mexico, in the State of Querétaro, 27 miles east of the city of that name (Map: Mexico, J 7). It is noted for silver-mining and for its trade in opals. It is an irregularly built town, founded in 1531. Population, in 1895, 9040.

SAN JUAN DEL SUR, dĕl sōōr. A seaport of Nicaragua, on the Pacific coast, 65 miles southeast of Managua (Map: Central America, D 5). Its harbor is small, but deep, and it is a submarine cable station, and the port for Rivas. The western terminus of the proposed Nicaragua Canal is a few miles north. Population, 1000.

SAN JUAN RIVER. The outlet of Lake Nicaragua in Central America. It leaves the lake at its southeastern end, and flows 110 miles in a winding southeast course on the boundary between Nicaragua and Costa Rica, emptying into the Caribbean Sea through a delta of several arms (Map: Central America, E 5). The mouth of one of these forms the harbor of Greytown (San Juan del Norte). The river is broad, deep, and tranquil, but near the middle it is completely obstructed by the rapids of Machuca. The San Juan forms part of the Nicaragua route for the proposed interoceanic canal. See NICARAGUA CANAL.

ŚANKARA, or **ŚANKARĀCĀRYA,** shän'kä-rä-chär'yä (c.788-?). A Hindu philosopher and commentator on the *Vēdānta* (q.v.). According to tradition he was born in the village of Kalapi in Kerala or Malabar, and was the son of Sivagurusarman. He founded a famous school at Sringagiri, but later journeyed as far as Kashmir and died at Kanci, a village there. About his life many legends clustered, and he was popularly regarded as an incarnation of Siva (q.v.) on account of his name Sankara, an epithet of Siva. An enormous number of works is attributed to him, most of which are doubtless spurious. He is one of the most important figures in the history of Hindu philosophy because of his *Brahmasūtrabhāṣyā,* a commentary which is indispensable for an understanding of the *Brahmasūtras* of Badarayana, the founder of the Vedanta school of philosophy (edited at Bombay, 1890-91). Consult: Windischmann, *Sancara* (Bonn, 1833); Deussen, *System des Vedânta* (Leipzig, 1883); id., *Sûtra's des Vedânta* (ib., 1887).

SAN'KEY, IRA DAVID (1840—). A Methodist evangelist, born at Edinburgh, Lawrence County, Pa. In 1870 he met Dwight L. Moody (q.v.) and they became associated in revivalistic work, continuing together for many years. They visited Great Britain from 1873 to 1875 and again in 1883, and made many tours throughout the United States. In these meetings Sankey had charge of the singing. After severing his connection with Moody he frequently conducted meetings alone. His compilations of devotional music, containing many of his own compositions, are *Gospel Hymns, Sacred Songs,* and *Sacred Songs and Solos.*

SANKHYA, sän'kyä (Skt. *sānkhyā,* enumeration). The name of one of the six great systems of orthodox Hindu philosophy. It is complemented, deistically, by the *Yōga* (q.v.) system, and, like the two *Mīmāmsās* (q.v.), the *Nyāya* (q.v.), and *Vāiśeshika* (q.v.) systems, it professes to teach the means by which eternal beatitude may be attained. This means is the discriminative acquaintance with *tattva,* or the true principles of all existence, and such principles are, according to the Sankhya system, the following 25: (1) *Prakṛti* (q.v.) or *Pradhāna,* the (intellectual) basis. Its first production is (2) *Mahat,* the great, or *Buddhi,* intellect, or the intellectual principle, which appertains to individual beings. From it devolves (3) *Ahaṁkāra,* the assertion of the ego, the function of which consists in referring the objects of the world to the ego. This produces (4-8) five *tanmātras,* or

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subtle elements which themselves are productive of the five gross elements (see 20-24). Ahaṁkara further produces (9-13) five instruments of sensation, the eye, the ear, the nose, the tongue, and the skin; (14-18), five instruments of action, the organ of speech, the hands, the feet, the excretory termination of the intestines, and the organ of generation; lastly (19), *manas*, the organ of volition and imagination. The five subtle elements (see 4-8) produce (20-24) the five gross elements, *ākāśa*, space or ether, which has the property of audibility, and is derived from the sonorous tanmatra; air, which has the properties of audibility and tangibility, and is derived from the aërial tanmatra; fire, which has the properties of audibility, tangibility, and color, and is derived from the igneous tanmatra; water, which has the properties of audibility, tangibility, color, and savor, and is derived from the aqueous tanmatra; lastly, earth, which unites the properties of audibility, tangibility, color, savor, and odor, and is derived from the terrene tanmatra. The twenty-fifth principle is *purusha* (q.v.) or soul. From the union of soul and *Prakṛti* comes creation. Nature as matter is a product of intellect.

The soul's wish is fruition or liberation. In order to become fit for fruition, the soul is in the first place invested with a *linga śarīra*, or *śūkṣma śarīra*, a subtle body, which is composed of *buddhi* (2), *ahaṁkāra* (3), the five *tanmātras* (4-8), and the eleven instruments of sensation, action, and volition (9-19). This subtle body is invested with a grosser body, which is composed of the five gross elements (20-24), or according to some, of four, excluding *ākāśa*, or, according to others, of one alone, earth. The grosser body, propagated by generation, perishes; the subtle frame, however, transmigrates through successive bodies. Some assume, besides, that between these two there is a corporeal frame, composed of the five elements, but tenuous or refined, the so-called *anuṣṭhāna śarīra*. Besides the twenty-five principles, the Sankhya also teaches that nature has three essential *guṇas* or characteristics, *sattva*, being, sometimes defined as pure being or goodness; *rajas*, energy, or passion; and *tamas*, darkness, the characteristic of sloth and inertia. The knowledge of the principles, and hence the true doctrine, is, according to Sankhya, obtained by three kinds of evidence, perception, inference, and right affirmation, which some understand to mean the revelation of the Veda and authoritative tradition.

The Sankhya in its first form is atheistical, but it underwent a mythological development in the Puranas (q.v.), in the most important of which it is followed as the basis of their cosmogony. Thus, Prakriti, or nature, is identified by them with Maya (q.v.), and the Matsya-Purana affirms that Buddhi, the intellectual principle, through the three qualities, being, passion, and darkness, became the three gods, Brahma, Vishnu, and Siva. The most important development, however, of the Sankhya is that by the Buddhistic doctrine, which is mainly based on it. The Sankhya system is probably the oldest of the Hindu systems of philosophy, for its chief principles are, with more or less detail, already contained in the secondary Upanishads (q.v.); but the form in which it has come down to us is probably older than that in which the other systems are preserved, although the question of priority is very much involved.

The reputed founder of the Sankhya is Kapila, who is said to have been a son of Brahma, or else an incarnation of Vishnu. He taught his system in Sutras (q.v.), which, distributed in six lectures, bear the name of *Sānkya-Pravacana*, though the antiquity of this work has been questioned. The oldest commentary is that by Aniruddha, translated by Garbe (Calcutta, 1888-92); another is that by Vijnanabhikshu. The first summary of the Sankhya doctrine is given by Iśvara Krishna, in his *Sānkhya-Kārikā*, edited by Wilson, with a translation of the text by Colebrooke, and a translation of the commentary of Gaudapada by himself (Oxford, 1837). Consult: Hall, in the preface of his edition of the *Sāṅkhya-Pravacana* (Calcutta, 1856); id., *Contribution toward an Index to the Bibliography of the Indian Philosophical Systems* (ib., 1859); Garbe, *Die Sānkhya-Philosophie* (Leipzig, 1894); id., *Sānkhya und Yoga* (Strassburg, 1896); Müller, *Six Systems of Hindu Philosophy* (New York, 1899).

SANKT INGBERT, zäṅkt ĭng'bĕrt. A town of the Palatinate, Bavaria, Germany, 14 miles west of Zweibrücken. It has machinery, glass, and iron works, and some coal mines. Population, in 1900, 14,048.

SANKT JOHANN, yō-hän'. A town in the Rhine Province, Prussia, on the Saar, opposite Saarbrücken (Map: Prussia, B 4). It is the shipping centre of the Saarbrücken coal-mining district, and manufactures machinery, iron ware, wire rope, etc. Population, in 1900, 21,257.

SANKT MORITZ. See SAINT MORITZ.

SANKT PÖLTEN, pĕl'ten. An ancient town in Lower Austria, 38 miles by rail west of Vienna (Map: Austria, D 2). It has a bishop's seminary. Ironware, weapons, cotton, paper, glass, and stoneware are manufactured. Population, in 1900, 14,510.

SANLÚCAR DE BARRAMEDA, sän lōō'-kär dā bär'rä-mā'dä. A town of Southern Spain, in the Province of Cadiz, situated among the dunes at the mouth of the Guadalquivir, 16 miles north of Cadiz (Map: Spain, B 4). It is a popular bathing resort. The vines covering the surrounding dunes produce the excellent Manzanilla wine. There are salt works and flour mills, and dynamite is manufactured in the neighborhood. The port is Bonanza, situated 2½ miles up the river; it is provided with a large iron pier, and connected by rail with Jerez. In 1519 Magellan sailed from Sanlúcar on his famous voyage around the world. Population, in 1887, 22,667; in 1900, 23,747.

SAN LUCAS, CAPE. See CAPE SAN LUCAS.

SAN LUIS, lōō-ēs'. A central province of Argentina, bounded on the north by La Rioja, on the east by Córdoba, on the south by the Territory of La Pampa, and on the west by Mendoza and San Juan (Map: Argentina, D 10). Area, estimated at 28,535 square miles. The surface is mountainous in the north, where there are also some saline steppes. The rest of the province is level, but sparsely watered. The Rio Salado runs along the western boundary. The climate is very dry, and the land is unsuited for agriculture. The mineral deposits are extensive and include copper, gold, iron, graphite, and other minerals. Only gold and copper are mined to any

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extent. Population, in 1900, 91,403. Capital, San Luis (q.v.).

SAN LUIS, or SAN LUIS DE LA PUNTA. The capital of the Province of San Luis, Argentina, situated at the southern end of the Sierra de San Luis, 140 miles southeast of Mendoza (Map: Argentina, D 10). It has a national college and a normal school. Its water supply, as well as the water used in irrigating the surrounding district, is derived from an immense artificial reservoir. The town is noted for the manufacture of ponchos, and exports horses, hides, and vicuña wool. Population, estimated, in 1898, 11,000.

SAN LUIS. A town of Luzon, Philippine Islands, in the Province of Pampanga, on the Rio Grande de Pampanga, about 10 miles northeast of Bacolor (Map: Philippine Islands, E 4). Population, estimated, in 1899, 10,298.

SAN LUIS DE LA PAZ, dâ lâ püs. A Mexican town in the State of Guanajuato, 53 miles northeast of the city of that name, situated on a branch railroad from Dolores Hidalgo. It has a beautiful parish church. Population, in 1895, 9601.

SAN LUIS POTOSÍ, pō'tô-sē'. An inland State of Mexico, bounded by the States of Coahuila and Nueva Leon on the north, Tamaulipas and Vera Cruz on the east, Hidalgo, Querétaro, and Guanajuato on the south, and Zacatecas on the west (Map: Mexico, J 6). Area, 25,316 square miles. The greater part of the State lies within the great Mexican plateau, but near the southeastern corner the plateau falls steeply several thousand feet to the low valley of the Pánuco. The climate is healthful in the elevated parts and hot and unhealthful in the lowlands, where fever prevails. The surface is abundantly wooded and the soil is very fertile in the valleys, producing grain, rice, sugar, and pepper. The mining industry, once very extensive, has declined, though the mineral deposits are far from exhausted. Commerce and manufactures, however, are increasing, and the State is one of the richest and most progressive in the Republic. The capital is San Luis Potosí (q.v.). Population, in 1900, 582,486, including a large proportion of Indians.

SAN LUIS POTOSÍ. The capital of the State of San Luis Potosí, Mexico, situated on the plateau at the head of the valley of the Verde, 215 miles northwest of Mexico, and 6200 feet above sea level (Map: Mexico, H 6). It is almost hidden by luxuriant gardens, and is regularly laid out, with broad streets and numerous plazas, on one of which is a marble fountain surmounted by a statue of Hidalgo. On the principal square stands the handsome cathedral and the fine city hall. Other notable buildings are the courthouse, the Governor's palace, the mint, and the Alarcón Theatre. The city is an important railroad centre. It has a considerable trade in cattle, wool, and hides. It derived its original importance from the famous silver mines in the neighboring Cerro de San Pedro, discovered in 1583; but though the mines are now almost abandoned, the city retains its prominence, and is the fourth in size in the Republic. Its population in 1895 was 69,050.

SAN MARCO IN LAMIS, sän mär'kô ên lä'mês. A town in the Province of Foggia, Italy, on the southwestern slope of Monte Gargano, 18 miles north by east of Foggia (Map: Italy, K 6). Cereals and fruits are produced, and wine and olive oil are manufactured. Population (commune), in 1901, 17,309.

SAN MARINO, mä-rē'nô. A republic in Italy, situated between the provinces of Forlì and Pesaro-Urbino, near the Adriatic coast, 12 miles southwest of Rimini (Map: Italy, G 4). Area, about 38 square miles; population, about 10,000. It is the oldest State in Europe and one of the smallest in the world. The district is hilly, the highest point being Monte Titano (about 2650 feet). The climate is healthful. Cattle-raising and wine production are the chief occupations. Stone figures among the exports. The uninteresting town of San Marino is situated on Monte Titano, and is protected by a wall. It has five churches and a fine Parliament house. The governing laws—the Statuta Illustrissimæ Reipublicæ—date from the Middle Ages. In 1847 the ruling Grand Council was transformed into a representative chamber, with 60 life members, chosen from the burghers, landowners, and the nobility. Two members are selected every six months as 'reigning captains.' From this council an executive council of 12 is chosen yearly. San Marino has a treaty of friendship with Italy. There is no public debt. The revenue for 1899-1900 was about £11,600, the expenditure, £13,700.

HISTORY. The city of San Marino, said to have been founded in the fourth century by Saint Marinus of Dalmatia, formed part of the Byzantine exarchate of Ravenna, and, after an uneventful existence under Lombard and Frankish rule, gradually established its independence with the aid of the counts of Montefeltro. In 1631 it received a formal acknowledgment of its independence from Pope Urban VIII. Napoleon did not deign to tamper with the liliputian republic, and sentiment, probably, led to the preservation of its identity in 1860-61, on the formation of the Italian kingdom, under whose protection the Republic placed itself in 1862. Consult: Franciosi, *Garibaldi e la repubblica di San Marino* (Bologna, 1891); Hauttecœur, *La république de San Marino* (Brussels, 1894).

SAN MARTIN, sän mär-tēn', JOSÉ DE (1778-1850). A South American general, distinguished for his services in the war of independence against Spain. He was born at Yapeyu in Argentina, February 25, 1778, and as a child was sent to Spain, where he received his education. He entered the army and served with distinction against the French. In 1811 he laid down his rank of lieutenant-colonel and in the following year went to Buenos Ayres, where he threw in his fortunes with the patriot cause. In January, 1813, he defeated the Spanish Viceroy at San Lorenzo and in the following year was placed in command of the insurgent army in Upper Peru. San Martin now conceived the design of destroying the Spanish power by overrunning Chile and then striking at the stronghold, Peru. After two years' preparation he set out in January, 1817, from Mendoza, with a well-drilled army of 4000 men, crossed the Andes with much hardship, and on February 12th routed the Spaniards at Chacabuco. This led to the occupation of the capital and the establishment of the Republic of which San Martin declined the proffered head-

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ship. Defeated at Cancha Rayada, March 19, 1818, he retrieved his fortunes by a decisive victory at the Maipo, April 5th, definitely ending the Spanish power in Chile. In August, 1820, he set sail from Valparaiso with an army of 4500 men, and landing at Pisco, some 150 miles south of Lima, entered the capital in July, 1821, and proclaimed the independence of Peru. In August he was chosen Protector. To Bolivar (q.v.), who in 1822 came to the aid of the Peruvians, San Martin left the task of completing the conquest of the country, resigning his command in August, 1822, and departing for Europe. He lived subsequently at Brussels and in France, and died at Boulogne, August 17, 1850. His life was one of devoted patriotism, marred neither by vainglory, factional hatred, nor personal interest.

SANMICHELI, sän'mē-kā'lē, MICHELE (1484-1559). An Italian architect, born in Verona. He went to Rome, worked under Bramante, and made the acquaintance of Michelangelo, of Sansovono, and of Antonio Sangallo, with whom he was employed in repairing the fortifications of Central Italy. Sanmicheli is reckoned the first to use the bastionary system of fortification. He built many beautiful portals in Venice and Verona, the Bevilacqua and Pompeii palaces in Verona, the latter being his masterpiece, the Church of the Madonna di Campagna in the same city, and in Venice the Palazzo Grimani, and the Palazzo Mocenigo, so famous for its façade.

SAN MIGUEL, mē-gāl'. A city of the Republic of Salvador, situated 70 miles east of San Salvador at the foot of the volcano of San Miguel or Jucuapa (Map: Central America, C 4). It is the third city of the Republic in size, the capital of a department of the same name, and the centre of a rich agricultural region. It has some foreign trade, especially in indigo. Population, about 25,000.

SAN MIGUEL DE ALLENDE, dā āl'yān'-dā. A town of Mexico. See ALLENDE.

SAN MIGUEL DE MAYUMO, dā mā-yōō'-mō. A town of Luzon, Philippine Islands, in the Province of Bulacán, situated 22 miles northeast of Malolos (Map: Philippine Islands, E 4). Population, estimated, in 1899, 20,460.

SAN MINIATO, mē'nē-ä'tō. (1) A city in the Province of Florence, Italy, 21 miles by rail west-southwest of Florence (Map: Italy, E 4). The tenth-century cathedral was remodeled in 1488. The city has an old castle, a lyceum, and a seminary. There are manufactures of glass, leather, and straw goods, and olive oil. Population (commune), in 1901, 20,042. (2) An ancient church near Florence (q.v.).

SANNAZARO, sän'nād-zä'rō, JACOPO (1458-1530). An Italian author, born at Naples. Trained at Naples, he was there introduced into the Arcadian Academy, in which he was known as Actius Syncerus. Frederick III., to whom he was devoted, gave him the villa at Mergellina, and when Louis XII.'s expedition of 1501 obliged Frederick to leave his realm, Sannazaro joined him in exile, and served him until his death in 1504. Sannazaro's masterpiece is the *Arcadia*, a pastoral composition in mingled prose and verse. The work was imitated and translated into foreign languages, and helped greatly to develop the pastoral in European countries. Sannazaro's minor works in Italian comprise some short monologues and a few allegorical farces, and his various *Rime*, largely Petrarchian in inspiration. His Latin compositions are among the best of the time. They include elegies, eclogues, and epigrams, besides a longer poem, *De Partu Virginis*. Consult: Colangelo, *Vita di Jacopo Sannazaro* (Naples, 1819); the *Life* in the edition of the *Opere Volgari* (Padua, 1723); the *Opere Latine* (Amsterdam, 1728); an edition of the *Arcadia*, and a discussion of its composition by M. Scherillo, in *Arcadia di Jacopo Sannazaro secondo i manoscritti e le prime stampe con note*, etc. (Turin, 1888).

SAN NICOLÁS, sän nē'kō-läs'. A town of Luzon, Philippine Islands, in the Province of Pangasinán, situated about 33 miles east of Lingayén (Map: Philippine Islands, E 3). Population, estimated, in 1899, 10,204.

SAN NICOLÁS, or SAN NICOLÁS DE LOS ARROYOS. A town of Argentina, in the Province of Buenos Ayres, on the Paraná River, 40 miles below Rosario and 125 miles northwest of Buenos Ayres (Map: Argentina, E 10). It is an important industrial centre, and has steam flour mills and large beef-preserving establishments. It is also a considerable railroad centre and a station for steamers. Population, estimated, in 1898, 15,000.

SANNYĀSIN, sän-nyä'sĭn (Skt., renouncer). The Sanskrit term for one who has renounced all earthly interests and has devoted himself to a life of asceticism and meditation. It referred originally to a Brahman in the fourth and last stage of his life. (See BRAHMANISM.) The meaning of the word has been extended, however, to include all religious mendicants, chiefly of the Sivite sects (see SAIVAS), who subsist on alms and live a life of contemplation.

SAN PABLO, pä'blō. A town of Luzon, Philippine Islands, in the Province of Laguna, situated about 16 miles south of Santa Cruz (Map: Philippine Islands, F 5). Population, estimated, in 1899, 19,537.

SAN PEDRO, pē'drō. The seaport of Los Angeles (q.v.).

SAN PEDRO, pā'drō. A town of Paraguay, 90 miles north of Asuncion, on the right bank of the Jujuy (Map: Paraguay, F 8). It has exports of maté and rubber. Population, about 7000.

SAN PIER D'ARENA, pē-ār' dā-rā'nā. A town in the Province of Genoa, Italy, 2½ miles west of Genoa, of which it is a suburb. It has a separate city government. It contains the beautiful Palazzo Scassi. The Church of Santa Maria della Cella is embellished with frescoes. The city has a technical school. It is a manufacturing centre, with a large sugar refinery, machine shops, and chemical and oil works. Population (commune), in 1901, 34,885.

SAN'POIL (apparently of North American Indian origin, although sometimes written as Fr. *Sans Poils*, hairless). A small tribe of Salishan stock (q.v.) formerly residing upon the river of the same name and now included with other tribes of the same region upon the Colville reservation, northeastern Washington. Lewis and Clark in 1804 mention them as *Hihighenimmo*, a corruption of their name among the Yakima. They are confederated with the Nespelim, speaking the same language, the two

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tribes being the most aboriginal in eastern Washington, and until very recently adhering strictly to their primitive conditions and religion. In 1892 the Sanpoil were estimated at 300 and the Nespelim at 62. In 1901 the whole body was estimated at 400.

SAN RAFAEL, rä'fä-ĕl'. The county-seat of Marin County, Cal., 15 miles north of San Francisco; on an inlet of San Pablo Bay, and on the San Francisco and North Pacific and the North Pacific Coast railroads (Map: California, B 3). It is near Mount Tamalpais, in a region of picturesque scenery, and is a popular resort. It has a Dominican college, the Hitchcock School, Mount Tamalpais Military Academy, and a public library. Population, in 1890, 3290; in 1900, 3879.

SAN REMO, rä'mô. A city in the Province of Porto Maurizio, Italy, on the Riviera, 26 miles by rail east-northeast of Nice (Map: Italy, B 4). The particularly mild climate has brought it into prominence as a winter resort. The old town, situated on a hill, is ill built, with narrow crooked streets, but the newer portion, along the coast, has fine promenades, villas, and gardens. The city has a thirteenth-century church, a seminary, and a technical school. The Villa Thiem contains a picture gallery. The products of the neighborhood are olives, lemons, and oranges, and there are manufactures of perfumes and mosaics. Population (commune), in 1901, 21,440.

SAN ROQUE, rō'kâ, CAPE. See CAPE SAN ROQUE.

SAN SALVADOR, säl'vä-dōr'. The name given by Columbus to the first island which he discovered in America. See GUANAHANI.

SAN SALVADOR. The capital of the Central American Republic of Salvador, situated a little west of the centre of the country, 25 miles from the Pacific coast, and near the foot of the extinct volcano of San Salvador (Map: Central America, C 4). Its houses are all low, surrounded by wide, open areas, and generally inclosing a central patio, being built with a view to withstanding earthquakes, to which the locality is particularly subject. Many of the large buildings are built of wood, including the new cathedral. Noteworthy are the national palace, the Casa Blanca ('White House') or Presidential mansion, the university, national library, astronomical observatory, and botanical garden. The city carries on a considerable trade in agricultural products, especially in indigo. The railroad to the port of Acajutla was completed in 1900. Population, about 30,000. San Salvador was founded in 1525 by Jorge de Alvarado. It has been a number of times nearly or quite destroyed by earthquakes, notably in 1854 and in 1873.

SANSCULOTTES, sän'kụ'lŏt' (Fr., without breeches, i.e. wearing trousers instead of the knee-breeches then in fashion). The name given in scorn, at the beginning of the French Revolution, by the Court party to the democrats of Paris.

SAN SEBASTIÁN, sän sä'bäs-tē-än'. The capital of the Province of Guipúzcoa, Spain, situated on the Bay of Biscay, 12 miles from the French frontier (Map: Spain, D 1). It is built in a very picturesque location on a sandy isthmus connecting the rocky and steep Monte Urgull with the mainland. The town was formerly fortified, and the mountain is still crowned by the fortress of La Mota. On the east the town is bounded by the Rio Urumea, and on the west by the Bay of Concha, which affords a spacious anchorage protected by the island of Santa Clara, and is lined with a magnificent beach along its inner shore. The old town lies at the foot of the mountain, and has been rebuilt since its destruction during the siege of 1813. A beautiful Alameda running across the isthmus separates it from the new town, which has wide, straight streets, and handsome parks and promenades. The most notable buildings are the town hall, with a handsome façade, the Palacio de la Diputación or provincial Government building, the magnificent hotel or Gran Casino facing the beach and surrounded by a park, the bull ring capable of seating 10,000 spectators, and the royal palace of Miramar, an unpretentious cottage built near the beach some distance west of the town. San Sebastián is the summer residence of the Spanish royal family, the most fashionable seaside resort in Spain, and one of the most beautiful in Europe. Its commerce and industries are considerable, and there are a number of flour and saw mills, iron foundries, and manufactures of paper, beverages, cloth, and hats, while the fisheries are also very important. The permanent population in 1887 was 29,047; and in 1900, 37,703.

Being a fortified port near the boundary, San Sebastián has often borne the brunt of Franco-Spanish wars. The fort was occupied by the French in 1813, and captured by the English and Portuguese by an assault in which the entire town was destroyed.

SAN SEBASTIÁN DE GOMERA, dâ gō-mä'rä. The chief town of the island of Gomera (q.v.).

SAN SEVERINO MARCHE, sä'vä-rē'nô mär'kâ. A town in the Province of Macerata, Italy, situated on the Potenza, 32 miles south-southwest of Ancona (Map: Italy, H 4). It has a cathedral with a Madonna by Pinturicchio, and a library. Machinery, metal and stone ware, glass, and flour are manufactured. There is a trade in wine, oil, fruit, and cattle. Population (commune), in 1901, 14,385.

SAN SEVERO, sä-vä'rô. A city in the Province of Foggia, Italy, 19 miles by rail northwest of Foggia (Map: Italy, K 6). It has a cathedral, a seminary, and a technical school. The country is fertile, producing grain and fruit, and affording rich pasturage. In 1799 San Severo was destroyed by the French. Population (commune), in 1901, 30,040.

SAN-SING, sän'sing'. The principal town of Northeastern Manchuria, on the Sungari (Map: China, G 2). Population, about 30,000. A fort and barracks are situated six or seven miles to the east. See KIRIN.

SAṄSKĀRA, säns-kä'rä. The name given to the forty rites incumbent on the three higher castes of Hindus. See SAṀSKĀRA.

SANSKRIT LANGUAGE (Skt. *saṁskṛta*, adorned, perfected, p.p. of *saṁskar*, to adorn, from *sam*, together + *kar*, to make). The name ordinarily applied to the whole ancient and sacred language of India. It belongs properly, however, to that dialect which was treated by the

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Hindu grammarian Panini (q.v.) and his followers. For the last 2000 years or more, until the present day, this language has led a more or less artificial life, being, like Latin during the Middle Ages, the means of communication and literary expression of the priestly, learned, and cultivated castes. (See SANSKRIT LITERATURE.) It is distinguished most obviously from the later derived dialects, Prakrit (q.v.) and Pali (q.v.), whose character and forms in relation to Sanskrit are closely analogous to those of the Romance languages (q.v.) in their relation to Latin. On the other hand, Sanskrit is distinguished, although much less sharply, from the oldest forms of Indian speech, preserved in the canonical and wholly religious literature of the *Veda* (q.v.), *Brahmaṇa* (q.v.), and *Upaniṣad* (q.v.). These forms of speech are in their turn by no means free from important dialectic, stylistic, and chronological differences, but they are comprised under the one name, Vedic (or, less properly, Vedic Sanskrit), which is thus distinguished from the language of Panini, whose proper designation is Sanskrit, or classical Sanskrit.

Vedic differs from Sanskrit about as much as the Greek of Homer does from classical Greek. The Vedic apparatus of grammatical forms was much richer and less definitely settled than that of Sanskrit, which gave up much of the earlier language without, as a rule, supplying the proper substitutes for the lost materials. Many case-forms and verbal forms of Vedic disappeared in Sanskrit. The subjunctive was lost, and about a dozen Vedic infinitives were reduced to a single one in Sanskrit. Sanskrit also gave up the most important heirloom which had been handed down by the Indian language from prehistoric times, the system of Vedic accentuation. It must be borne in mind, however, that Vedic, notwithstanding its somewhat unsettled richness, and its very archaic character, is not to be regarded as a popular tongue, but as the more or less artificial 'high speech,' handed down through generations by families of priestly singers. Both Vedic and Sanskrit were in a sense caste languages, based upon popular idioms. The grammatical regulation of Sanskrit at the hands of Panini and his followers, however, went beyond any academic attempts to regulate speech recorded elsewhere in the history of civilization.

The Vedic hymns, the earliest literary production of the Indian people, were composed in the northwest of India, in the river-basins of the Indus and its tributaries. The date of these hymns is unknown, B.C. 1500 being the conventional assumption; still less known is the time when the Aryans commenced their entry into India through the passes of the Hindu Kush. Nevertheless older forms lying behind the Vedic language may be reconstructed by the aid of comparative philology. The original home of the Vedic people was in the great Persian region on the northern side of the Himalayas. By comparison of Vedic and Sanskrit with the oldest forms of Persian speech, Avesta (q.v.) and Old Persian (q.v.), it is clear that these languages are collectively mere dialects of one and the same older idiom. This is known as the Indo-Iranian, or Aryan (in the narrower sense) language. The reconstructed Indo-Iranian language differs less from the language of the Veda than classical Sanskrit does from Prakrit and Pali. The language of the Persian Avesta is so much like that of the Veda that entire passages of either literature may be converted into good specimens of the other by merely observing the special laws of sound which each has evolved in the course of its separate existence. This Indo-Iranian language, again, is part of the greater linguistic community of the so-called Indo-Germanic languages (q.v.). See also PHILOLOGY.

Since the revival of classical learning there has been no event of such importance in the history of culture as the discovery of Sanskrit in the latter part of the eighteenth century. The study of this language opened up the primitive Indo-Germanic period, and originated the science of comparative philology in all its bearings. Linguistic science, comparative mythology, science of religion, comparative jurisprudence, and other important fields of historical and philosophical study, either owe their very existence to the discovery of Sanskrit or were profoundly influenced by its study. By its aid the spiritual monuments of Zoroaster (see AVESTA) were made accessible, as well as the stone monuments of the Persian kings of the Achæmenidan dynasty.

After Alexander's invasion of India the Greeks became acquainted to a certain extent with the learning of the Hindus. The Arabs in the Middle Ages introduced the knowledge of Indian science to the West, the so-called Arabic (in reality Indian) numerals among other things. Beginning with the sixteenth century, European nations, the Portuguese, Dutch, Danes, English, and French, obtained a more or less permanent foothold in India, but they sought material gain only; nevertheless a few European missionaries acquired some familiarity with Sanskrit, and Abraham Roger even translated the Sanskrit poet Bhartrihari (q.v.) into Dutch as early as 1651. But the first Sanskrit grammar to be published in Europe, that of Father Paulinus a Sainto Bartholomæo, was printed in Rome no earlier than 1790. English scholars in India, Sir William Jones, Charles Wilkins, H. F. Colebrooke, H. H. Wilson, and others, at the end of the eighteenth century, were the first real mediators between India and Europe. Wilkins's translation of the Bhagavadgita (q.v.) and Jones's translation of the Sakuntala (q.v.) elicited the greatest admiration. Especially in Germany, men like Herder, Goethe, the brothers Schlegel, and Wilhelm von Humboldt were profoundly moved and attracted to the new language, its literature, and its theosophy. Friedrich von Schlegel's *Ueber die Sprache und Weisheit der Indier* introduced the historical and comparative method into the science of language. Soon afterwards Franz Bopp (see PHILOLOGY; BOPP), in his treatise, *Ueber das Konjugationssystem der Sanskritsprache* (Frankfort, 1816), laid the foundation of the science of comparative grammar. Since then both Indology and comparative philology have won for themselves permanent positions among the intellectual disciplines in all centres of learning in Europe, America, and India.

The Sanskrit language has on the whole preserved the linguistic conditions of the Indo-Germanic parent speech better than any other member of the Indo-Germanic family of languages. In its vocalism it has merged the two 'triads' of vowels *a*, *e*, *o*, and *ā*, *ē*, *ō* respectively into *a* and *ā*; thus Indo-Germ. **andhos*, 'flower' (Gk. ἄνθος), and **menos*, 'mind' (Gk. μένος), are Skt. *andhas* and *manas*; Indo-Germ. **pōd*, 'foot,' and **di-dhē-*

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mi, 'set' (Gk. *τίθημι*) are Skt. *pād-* and *dadhāmi*. With this single exception Sanskrit reflects the prehistoric system of vocalism most perfectly. The preservation of the Indo-Germanic lingual vowels, *ṛ* and *ḷ*, as Skt. *ṛ*, as Indo-Germ. *e-dṛk-om*, 'I have seen,' Skt. *a-dṛś-am*, or **ṷlqos*, 'wolf,' Skt. *vṛka-s*, led to the recognition of the fact that lingual and nasal vowels belonged to the original stock of the whole family of languages, and was followed by far-reaching and permanent results concerning the entire system of vocalism. The Indo-Germanic indeterminate vowel or sh'wa (*ə*), appears in Sanskrit as *i*, and its wide preservation in Sanskrit led to the important theory of dissyllabic roots or stems. The preservation in many texts of the Veda of the old system of accentuation made it possible for Verner to discover his famous law (see VERNER'S LAW) which explained the apparent exceptions to Grimm's law (q.v.).

In its consonant-system Sanskrit has preserved the original five series of mutes: labials, dentals, palatals, gutturals, and labiovelars (see PHILOLOGY), and has in addition developed an important sixth series, the linguals or cerebrals, mutes produced by the influence of the *r* and *l* sounds. Thus Indo-Germanic **dendrom*, 'tree, staff' (Gk. *δένδρον*), becomes Skt. *danda*, 'staff;' or the Vedic root *nart*, 'dance,' becomes *naṭ* in Sanskrit. Most important is the undisturbed preservation in Sanskrit of the Indo-Germanic sonant aspirates, *bh*, *dh*, *gh*, which underwent radical changes in all other Indo-Germanic languages, as Indo-Germ. **bherō*, 'I carry,' Skt. *bharāmi*, but Gk. *φέρω*, Lat. *ferō*, Gothic *baíra*, etc. The Indo-Germanic surd aspirates are also preserved most clearly in Sanskrit, as *th* in Skt. *vet-tha*, 'thou knowest,' Gk. *ϝοῖσ-θα*, Gothic *wais-t;* or *kh* in Skt. *śankha*, 'conch-shell,' Gk. *κόγχος*.

Sanskrit has preserved all the Indo-Germanic cases, having independent forms for the instrumental and locative in addition to the more familiar cases of the remaining languages. In verb-formation it has retained and developed the distinction between the so-called thematic (*ō*-verbs) and non-thematic (*mi*-verbs), which has practically passed out of the remaining languages of the family with the exception of the Greek. Sanskrit abounds in varieties of present-systems and aorist-systems, offering in the last mentioned respect strikingly close parallels to Greek. The modal forms, such as the subjunctive, the injunctive, and the optative, are present, but have never developed into the delicate syntactical categories of either Greek or Latin. On the other hand, the so-called secondary systems of conjugation, intensive, desiderative, and causative, have become indefinitely productive, so that theoretically every verb is entitled to any of these formations, as Skt. *sīdati*, 'he sits,' and *sādayati*, 'he sets;' *naśyati*, 'he perishes,' and *nāśayati*, 'he destroys.'

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SANSKRIT LITERATURE. The literature in Sanskrit (see SANSKRIT LANGUAGE), like the language, may be divided into two periods, the Vedic and the Sanskrit. Notwithstanding the continuity of the Hindu writings, the spirit of Sanskrit literature differs greatly from the Vedic. The chief distinction between the two periods is that the Veda (q.v.) is essentially a religious collection, whereas Sanskrit literature is, with rare exceptions, profane. In the Veda the lyric and legendary forms are in the service of prayer, or exposition of the ritual; in Sanskrit epic, didactic, lyric, and dramatic forms have been developed far beyond their earlier forms for the purpose of literary delectation and æsthetic or moral instruction. In Sanskrit literature, moreover, with the exception of the *Mahābhārata* (q.v.) and the *Purāṇas* (q.v.), the authors are generally definite persons, more or less well known, whereas the Vedic writings go back to families of poets, or schools of religious learning, the individual authors being almost entirely unknown.

The form and style of Sanskrit literature differs generally from that of the Vedas (q.v.). Vedic prose was developed in the *Yajur-Vedas*, *Brāhmaṇas* (q.v.), and *Upaniṣads* (q.v.) to a tolerably high pitch; in Sanskrit, aside from the strained scientific language (*sūtra*) of philosophy and grammar, prose is found in genuine literature only in fables, fairy tales, romances, and partially in the drama. Nor has this prose improved in literary and stylistic quality, as compared with the earlier variety. On the contrary, it has become more and more clumsy and hobbling, full of long awkward compounds and other artificialities. As regards the poetic medium of classical Sanskrit, it also differs from the Veda. The bulk of Sanskrit poetry, especially the epic, is composed in the *ślōka* metre, a development of the Vedic *anuṣṭubh* stanza of four octosyllabic lines of essentially iambic cadence. But numerous other metres, usually built up on Vedic prototypes, have become more and more elaborate and strict than their old originals, and in the main they have also become more artistic and beautiful.

Sanskrit literature may be divided into epic, lyric, didactic, dramatic, and narrative. EPIC

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Poetry falls into two classes, the freer narrative epic termed *itihāsa*, 'legend,' or *purāṇa*, 'ancient tale,' and the artistic or artificial epic, called *kāvya*, 'poetic product.' The great epic of the *Mahābhārata* (q.v.) is by far the most important representative of the former kind. Of somewhat similar free style are the eighteen *Purāṇas* of much later date. (See Purāṇa.) The beginnings of the artistic style are seen in the other great Hindu epic, the *Rāmāyaṇa* (q.v.), which the Hindus themselves regard as the product of a single author, Valmiki. But the finished epic *kāvya* is not evolved until the time of Kalidasa (q.v.), about the sixth century A.D. This universal poet and dramatist is the author of the two best known artistic epics, the *Kumāra-saṁbhava*, or Birth of the War God, and the *Raghuvaṁśa*, or Race of Raghu.

The *Kumāra-saṁbhava* consists of seventeen cantos, the first seven of which are devoted to the courtship and wedding of the deities Siva and Parvati, the parents of the youthful god of war. Usually only these seven are printed, owing to the erotic character of the remaining cantos. The real theme of the poem appears only toward the end, in the account of the destruction of the demon Taraka, the object for which the god of war was born. The artistic, or rather the artificial, character of the *kāvyas* removes them far from the sphere of the genuine epic; their interest and power lies especially in their wealth of descriptive power and delicacy of illustration, and not so much in their portrayal of important characters or stirring action. The *Raghuvaṁśa*, in nineteen cantos, describes in the first nine the life of Rama together with that of his dynasty, beginning with his forefather Dilipa. Then in the next six cantos comes the story of Rama himself, the same theme as that of the *Rāmāyaṇa*. The remaining cantos deal with the twenty-four kings who ruled as Rama's descendants in Ayodhya. The remaining *kāvyas* deal for the most part with themes from the *Mahābhārata* and *Rāmāyaṇa*. The epic is commingled more and more with lyric, didactic, and erotic elements, as well as with bombast and verbal jugglery (puns) of every kind. The Hindus consider six *kāvyas* entitled to the name 'great epic' (*mahākāvya*) in addition to the two of Kalidasa just mentioned, the *Kirātārjunīya* of Bharavi (q.v.), describing a combat between Siva and Arjuna; the *Śiśupāla-vadha* of Magha, describing how Sisupala, son of a king of Cedi, and cousin of Krishna, was slain by Vishnu; the *Nāiṣadhīya* ascribed to Harsha (q.v.), a version of the story of Nala, King of Nishadha, the hero of a well-known episode of the *Mahābhārata;* and finally the *Bhaṭṭikāvya*. The last mentioned 'epic' is ascribed to the lyric poet Bhartrihari. It tells the story of Rama, but is composed with the avowed object of illustrating the rules of grammar, especially the irregular forms of the language.

Every form of artistic Sanskrit literature, whether epic, dramatic, or confessedly lyric, has a strong lyric cast. At the bottom these three kinds, in the Hindu poet's hands, are but thematically differentiated forms of the same poetic endowment. Ornate figures of speech, singly or in masses, luxuriant richness of coloring, carried into literary composition from the gorgeousness of the climate, flora, and fauna of India; subtle miniature painting of every sensation and emotion—these are the common characteristics of Hindu artistic poetry.

Lyric Poetry can hardly do more than emphasize or specialize these conditions, yet it has its individual traits, the most important of which is the refined elaboration of the single strophe in distinction from continuous composition. The forms of these strophes are very elaborate, and almost infinitely varied. Nowhere else in literature have poets expended so much ingenuity, patience, or art upon the elaboration of metric form; nowhere is the attempt made so persistently to harmonize the sentiment of a stanza with its metrical coloring. The most elaborated of the longer lyric compositions are the *Mēghadūta*, or Cloud Messenger, and the *Ṛtusaṁhāra*, or Cycle of Seasons, both by Kalidasa. The theme of the former is a message sent by an exiled Yaksha (elfin) to his love by a cloud. The first part of the poem describes the scenes through which the cloud will pass in its course; in the second part the Yaksha pictures his far-off home and the charms of his beloved, whom he imagines tossing on her couch, sleepless and emaciated, through the watches of the night. When the cloud beholds her, let it tell of his own longings, how in creepers he beholds her form, in the eyes of startled hinds her glances, in the moon her lovely face, and in peacocks' plumes her shining tresses. May the cloud, after delivering his message, return with reassuring news, and never himself be separated from his lightning spouse. The *Cycle of Seasons* is famous for its descriptions of India's tropical nature, interspersed with expressions of human emotion. Spring, that causes the downpour of the pollen of the mango blossoms, that intoxicates the world with his fragrance, and swarms with honey-drunk bees, arouses sweet longings in every breast. In the rainy season, when the lover, confined at home by the downpour of the waters, shivers with cold, his long-eyed love presses him to her heart, and turns the dreary day to sunshine. The poet's deep sympathy with nature, his keen powers of observation, and his skill in depicting an Indian landscape are equaled by his subtle appreciation of every human mood.

The bulk of lyrical poetry, however, is in single miniature stanzas which suggest strongly the didactic sententious proverb poetry which the Hindus also cultivated with great success. In fact, the most famous collection of such stanzas, that of Bhartrihari (q.v.) consists of both lyric, didactic, and philosophic poems. Bhartrihari, who lived in the seventh century, is perhaps the most remarkable poet of India next to Kalidasa. Apparently he was also a prominent grammarian, and he certainly was a good deal of a philosopher. His stanzas, 300 in number, are divided into three 'centuries,' the *Śṛṅgāra-śataka*, or Century of Love, the *Nīti-śataka*, or Century of Wisdom, and the *Vairāgya-śataka*, or Century of Renunciation. There is, of course, no action in these stanzas. Ever and again, within the narrow frame of a single stanza, the poet pictures the world of him for whom the wide universe is woman, from whose eyes there is no escape.

The second great master of the erotic stanza is Amaru, who is probably of a later date than Bhartrihari. His collection is known as *Amaru-śataka*, or Century of Amaru. He also is a mas-

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ter in the art of painting all the moods of love, bliss and dejection, anger and devotion. Neither he nor the other Indian lyrists treat love from the romantic or ideal point of view; it is always sensuous. But delicacy of feeling and expression, and refined appreciation of those qualities which attract irresistibly, only finally to repel, lift their stanzas high above either the coarse or the commonplace. It is 'minne-song,' flavored with the universal, though rather theoretical, Hindu pessimism.

Even in lyrics the Hindu's deep-seated tendency toward speculation and reflection is evident. Not only has it been the basis of much that is highest and best in the religion and philosophy of India, but it has also assumed shape in another very important product of Hindu literature, the GNOMIC, DIDACTIC, SENTENTIOUS STANZA, which may be called the PROVERB. Böhtlingk has collected from all parts of Sanskrit literature some 8000 of these stanzas; they begin with the *Mahābhārata*, and are found in almost every moral appended to the fable literature. Their keynote is again the vanity of human life, and the superlative happiness that awaits resignation. The mental calm of the pious anchorite, who lives free from all desires in the solitude of the forest, is the only remedy for human unrest. But for him who remains in the world there is also a kind of salvation, namely, virtue. When a man dies and leaves all his treasures and his loved ones behind, his good works alone can accompany him on his journey into the next life. Hence the practical value of virtue almost overrides the pessimistic view of the vanity of all human action. These gnomic stanzas were frequently composed or gathered up into collections. Bhartrihari's above-mentioned two centuries on wisdom and renunciation are compositions of this sort. A Kashmirian poet named Silhana is the author of the *Śānti-śataka*, or Century of Tranquillity, and another collection is designated *Mōha-mudgara*, or Hammer of Folly. There are many other collections from all periods, but naturally the ethical saw is most at home in the fables of the *Pañcatantra* (q.v.) and *Hitōpadēśa* (q.v.). These works go back to Buddhist models, which recall the fact that the *Dhammapada*, a Buddhist collection of aphorisms, contains perhaps the most beautiful and profound words of wisdom in all Hindu literature. It may be said that there is scarcely a conceit or adage of the proverb literature of other peoples that may not be paralleled in Hindu stanzas.

The Sanskrit DRAMA is one of the latest, though one of the most interesting products of Sanskrit literature. With all the uncertainty of literary dates in India there is no reason for assuming for this class of works a date earlier than the fifth or sixth century of our era. Certain Vedic hymns in dialogue are all that the earliest time suggests as a possible, but very doubtful, basis of the drama. The Sanskrit name for drama is *nāṭaka*, from the root *naṭ*, *nart*, 'to dance.' The word therefore means literally 'ballet;' it is not doubtful that dances contributed something to the development of the drama. In various religious ceremonies of earlier times dancing played a part; at a later time the cult of Siva and Vishnu, and especially of Vishnu's incarnation, the god Krishna, was accompanied by pantomimic dances. These pantomimes reproduced the heroic deeds of these gods and were accompanied by songs. Popular representations of this sort, the so-called *Yātras*, have survived to the present day in Bengal. They are not dissimilar to the mystery plays of the Christian Middle Ages, and their modern continuation, the passion plays. The god Krishna and Radha, his love, are the main characters, but there are also friends, rivals, and enemies of Radha. The *Yātras*, a mixture of music, dancing, song, and improvised dialogue, while undoubtedly in some way connected with the origin of the drama, are nevertheless separated by a very wide gap from the finished product of the *nāṭaka*, as it appears in such dramas as the *Śakuntalā* of Kalidasa, or the *Mṛcchakaṭikā* (q.v.), or Toy Cart, of Sudraka (q.v.).

It is still a moot question whether Western (Greek) influence, particularly the New Attic comedy of Menander, as reflected in Plautus and Terence, has not in some measure contributed to the shaping of the Hindu drama. It is known that Greek actors followed Alexander the Great through Asia, and that they celebrated his victories with dramatic performances. After the death of Alexander, Greek kings continued to rule in Northwestern India. Brisk commerce was carried on between the west coast of India and Alexandria, the later centre of Greek literary and artistic life. Greek art and Greek astronomy undoubtedly exercised strong influence upon Hindu art and science. The chief points of resemblance between the Hindu drama and the Greek comedy are as follows: The Hindu drama is divided into acts (from one to ten) separated by various periods of time, from one day to long periods; the acts proper are preceded by a prologue spoken by the stage manager (*sūtradhāra*). The stage was a simple rostrum not shut off from the auditorium by a curtain, but, on the contrary, the curtain was in the background of the stage, and was called *yavanikā*, that is, Greek curtain (Ἰωνική). The characters of the Hindu drama resemble in some respects those of the Attic comedy. There are bayaderes and parasites, braggarts, and cunning servants. Especially the standard comic figure of the Hindu drama, the *vidūṣaka*, the unromantic friend of the hero, has been compared with the go-between, the *servus currens*, of the Græco-Roman comedy. The vidushaka is a hunchbacked, bald dwarf of halting gait, and is the clown of the piece. Though a Brahman by birth—with maliciously humorous intent—he does not speak Sanskrit, but a popular dialect, Prakrit (q.v.), like the women (with rare exceptions) and all the inferior personages of the play. He plays the unfeeling realist, intent upon every form of bodily comfort, especially a good dinner, to the hero's sentimental flowery romanticism. Although it is not possible to prove that one or the other external feature of the Hindu drama may not be due to some outside influence, its inner matter is certainly altogether national and Indic. The themes are for the most part those of the heroic legend in the epics, or they move in the sphere of the actually existing Hindu courts. On the whole, they are not different from those that figure in the tales and romances which are worked up in narrative form. It must not be forgotten that certain general coincidences between the drama and the theatre of different peoples are due to the common psychological

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traits of all peoples; hence genuine historical connection in such matters requires the most exacting proof.

The chief dramatic writer of India is Kalidasa, master at the same time also of epic and lyric poetry. Three dramas are ascribed to him: the *Śakuntalā*, the *Urvaśī*, and the *Malāvikāgnimitra*, or Malavika and Agnimitra. From a time somewhat earlier than that of Kalidasa comes the drama *Mṛicchakaṭikā*, the Toy Cart, said to have been written by a king by the name of Sudraka, who is praised ecstatically in the prologue to the play. It is altogether likely that some poet at Sudraka's court, perhaps Dandin (q.v.), wrote the play, and out of gratitude for benefits received, endowed the King with the glory of its authorship. Similarly during the seventh century a king named Harsha (q.v.) is said to have composed three dramas: *Ratnāvalī*, or the String of Pearls; the *Nāgānanda*, whose hero is a Buddhist, and whose prologue is in praise of Buddha; and the *Priyadarśikā*. From the eighth century date the dramas of Bhavabhuti (q.v.), a South Indian poet, who is, next to Kalidasa and Sudraka (Dandin), the most distinguished of the Hindu dramatists. His most celebrated drama is the *Mālatīmādhava*, or Malati and Madhava; and the two dramas *Mahāvīracarita* and *Uttararāmacarita*, both of which deal with Rama, the hero of the *Rāmāyaṇa*. Finally may be mentioned Viśakhadatta, the author of the *Mudrārakṣasa*, the Seal of the Minister Rakshasa, a drama of political intrigues, whose composition also dates from the eighth century.

It is not possible within a short space to characterize the great variety of all these themes, the different talents of their authors, and the style and literary quality of these compositions. "Action is the body of the drama," such is the dictum of the Hindu theorists. Precisely what we should call dramatic action is not the prominent quality of the compositions of the greatest poet of them all, Kalidasa. His dramas are distinguished rather by tenderness of feeling and delicacy of touch. They are lyric rather than dramatic. The action is slow, the passions are profound rather than elemental. The deepest feelings are portrayed in delicate forms which never broach upon violence or coarseness, but, on the contrary, are almost over-nice. At the height of their sentiments, in profound misery, the hero and the heroine still find time to institute comparisons between their own feelings and the phenomena of nature. There is, indeed, a plethora in them all of mango trees and *pāṭala*-blossoms, of creepers and lotus, of bimba-lips, of gazelles, flamingoes, and multicolored parrots. Yet they are always artistic and finished, especially when the climate and life of India is borne in mind, and their beauty suggests strongly the genius of Goethe.

No department of Indian literature is more interesting to the student of comparative literature than that of the FABLES AND FAIRY TALES. There is scarcely a single motive of the European fable collections that does not appear in some Hindu collection; and there is, indeed, good reason for believing that the bulk of this kind of literature originated in India. The earliest and most important collection of Hindu fables is Buddhistic, and is written in Pali; it seems to reach back to the fourth century B.C. This collection is known as the *Jātakas* (q.v.), or Birth Stories. Buddha himself is made to appear in every one of them in the guise of the wise or successful animal of the fable, and he himself points the moral of the fable in the usual didactic proverb stanza. This feature is, of course, secondary, but the fables themselves are very old. The two most important Sanskrit collections, the *Pañcatantra* and the *Hitōpadēśa*, are based upon Buddhist sources. A noteworthy feature of the Sanskrit collections of fables and fairy tales is the insertion of a number of different stories within the frame of a single narrative, a style of narration which was borrowed by other Oriental peoples, the most familiar instance being the *Arabian Nights*. The *Pañcatantra*, or Five Books, the most celebrated Sanskrit collection, existed at least as early as the first half of the sixth century A.D., since it was translated by order of King Khosru Anushirvan (531-579) into Pahlavi (q.v.), the literary language of Persia at that time. It passed from the Pahlavi into Arabic, Greek, Persian, Turkish, Syriac, Hebrew, Latin, and German; and from German into other European languages. The Buddhistic origin of the *Pañcatantra* was effaced as much as possible by the Brahman redactors by means of omissions and changes. The name *Pañcatantra* is probably not original, having perhaps displaced Karataka and Damanaka, or some similar title derived from the names of two jackals in the first book. This may be surmised because the title of the Syriac version is *Kalilag and Damnak*, of the Arabic version *Kalilan and Dimnah*. Both the *Pancatantra* and the *Hitōpadēśa*, or Salutary Instruction, were originally intended as manuals for the instruction of princes in domestic and foreign policy. The *Hitōpadēśa*, said to have been composed by Narayana, professes to be an excerpt from the *Pañcatantra* and other books.

The most famous collection of fairy tales is the very extensive *Kathāsaritsāgara*, or Ocean of Rivers of Stories, composed by the Kashmirian poet Somadeva (q.v.) about A.D. 1070. Three much shorter collections are in prose. The *Śukasaptati* (q.v.), or Seventy Stories of the Parrot, in which a wife whose husband is abroad, and who is inclined to solace herself with other men, is for seventy nights cleverly entertained and deterred by the story-telling parrot until her husband returns, is one of the best. The *Vētāla-pañcaviṁśati*, or Twenty-five Tales of the Vampire, is known to English readers under the title of *Vikram and the Vampire*. The third collection is the *Siṁhāsana-dvātriṁśikā*, or Thirty-two Stories of the Lion-seat (throne), in which the throne of King Vikrama tells the stories. All these collections have an outer frame story, within which a certain part of the common Hindu stock of tales is inserted. A few PROSE ROMANCES of more independent character, dating from the sixth and seventh centuries, may be mentioned in this connection. The Hindu theorists class them as poems (*kāvya*), but they are much more like our own earlier novels. The *Daśa-kumāra-carita*, or Adventures of the Ten Princes, a story of common life and a very corrupt society, reminds one of the *Simplicissimus* of Grimmelshausen. Its author is Dandin (q.v.), and it probably dates from the sixth century A.D. *Vāsavadattā*, by Subandhu (q.v.), of somewhat later date, is a highly artificial romance, which formed the stylistic basis of the *Kādambarī*, by Bana (q.v.); the latter narrates, in stilted language and long

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compounds, the romantic sentimental love story of an ineffably noble prince and the equally ineffably beautiful and virtuous fairy princess Kadambari. Other works of this class, known as *carita*, continue to be composed at a later time. The same term, *carita*, is also used for CHRONICLES, or quasi-historical literature. Historical works in the European sense do not exist in India. The nearest approach to history in our sense of the word is the *Rājatarangiṇī* (q.v.), or the Chronicle of Kashmir, by Kalhana. A modern work of a similar kind, but of much smaller extent is the *Kṣitīśavaṁśāvalicarita*, the chronicle of a series of royal families who reigned in Bengal. It was composed in the middle of the eighteenth century.

India abounds in all forms of SCIENTIFIC LITERATURE, written in tolerably good Sanskrit even to the present day. The ancient legal books of the Veda continue in modern poetical *Dharmaśāstras* and *Smṛtis*, of which the *Law-books of Manū* (see MANU) and *Yājñavalkya* are the most famous examples. Rooted in the Upanishads (q.v.) are the six Hindu systems of philosophy and their abundant writings. (See the articles MĪMAṀSA, NYĀYA, SĀṀKHYA, VAIŚĒSHIKA, VĒDĀNTA, and YŌGA.) Grammar, etymology, lexicography, prosody, rhetoric, music, and architecture each own a technical literature of wide scope and importance. The earliest works of an etymological character are the Vedic glosses of Yaska (see NIRUKTA); later, but far more important, is the grammar of Panini (q.v.), one of the greatest grammarians of all times, and his commentators Katyayana and Patanjali. Mathematics and astronomy were eagerly cultivated from very early times, the so-called Arabic numerals coming to the Arabs from India, and designated by them as Hindu numerals. Indian medical science must have begun to develop before the beginning of our era, for one of its chief authorities, Caraka, was the chief physician of King Kanishka in the first century A.D. The germs of Hindu medical science reach back to the *Atharva-Veda*. (See VEDA.) The Bower manuscript, one of the oldest of Sanskrit manuscripts (probably fifth century A.D.), contains medical statements which agree verbally with passages in the works of Suśruta and Caraka, the leading authorities on this subject.

BIBLIOGRAPHY. A brief but convenient sketch of Sanskrit literature is Macdonell, *History of Sanskrit Literature* (New York, 1900). The bibliographical notes at the end of the book are a safe guide to more extensive study. The German work of Schroeder, *Indiens Litteratur und Cultur* (Leipzig, 1887), contains a fuller, very instructive and very readable account of Sanskrit literature; copious translations and digests of the texts themselves make this work especially practical and helpful. The *History of Ancient Sanskrit Literature*, by Max Müller (2d ed., London, 1860), is limited to the Vedic period and does not really bear upon the present theme. Weber's *Akademische Vorlesungen über indische Litteraturgeschichte* (2d ed., Berlin, 1876, translated by T. Zachariae, London, 1878, with additional notes by Weber), is a learned and technical work not at all adapted to the wants of the general reader, and is now partly antiquated, though still valuable. Readable and popular in style are Frazer, *Literary History of India* (New York, 1898), and Monier-Williams, *Indian Wisdom* (London, 1876), which contains numerous specimens of Sanskrit literature in translations. The *Grundriss der indo-arischen Philologie*, commenced under the editorship of Bühler, and continued after his death by Kielhorn (Strassburg, 1896 et seq.), covers the entire domain of Indo-Aryan antiquity, and contains authoritative information regarding many points and problems of Sanskrit literature.

SANSOVINO, sän'sō-vē'nō, ANDREA, properly ANDREA CONTUCCI (1460-1529). One of the principal Florentine sculptors of the High Renaissance. He was born at Monte San Sovino, near Arezzo, and studied at Florence with Antonio Pollajuolo and Bertoldo. The most important of his early works are reliefs of the "Annunciation," a "Pietà," and the "Coronation of the Virgin," in Santo Spirito, Florence. About 1490 he was appointed sculptor and architect to John II., King of Portugal, for whom and his successor, Emanuel I., he built a royal palace and executed sculptures, of which a bronze bas-relief of John and a statue of Saint Mark still exist at Coimbra. After nine years' absence, he returned to Florence and occupied himself with a font for the Baptistery at Volterra (1502); a "Madonna and Child" and a "Saint John Baptist" for the cathedral at Genoa (1504); and a group, the "Baptism of Christ," above the doors of the Baptistery at Florence. Though completed a century later by Vincenzo Danti, the figures are as beautiful in conception and execution as their disposition is monumental.

After 1505 he went to Rome and executed for Pope Julius II. his two chief works, the monuments of the two cardinals Sforza and Basso in the Church of Santa Maria del Popolo. He made for a chapel of the Church of San Agostino a "Madonna with Child and Saint Anne," and went to Loreto in 1513 to superintend the decoration of the Casa Santa, most of which was executed by his pupils, and is mannered in style. His statues are executed with admirable technique and are mild and beautiful in conception, but they possess the generality of type derived from the antique common to the High Renaissance, with a consequent loss of characteristic and individual qualities. Consult: Schönfeld, *Andrea Sansovino und seine Schule* (Stuttgart, 1881); Rosenberg, in Dohme, *Kunst und Künstler Italiens* (Leipzig, 1879).

SANSOVINO, JACOPO (TATTI) (1477-1570). A Florentine sculptor and architect of the High Renaissance. He was born at Caprese, near Florence, the son of Antonio Tatti; but he adopted the name of Sansovino from Andrea, his first master. His first work as a sculptor was a "Saint John" submitted in competition with Rafaello di Montelupo. At Rome he gained the friendship and patronage of Bramante, and Pope Julius II. employed him to restore antique statues. Returning to Florence, he modeled the beautiful nude "Bacchus," now in the Uffizi, and many other figures. In 1511 he returned to Rome and fashioned the colossal "Madonna" for the Church of San Agostino. His design for the Church of San Giovanni dei Fiorentini in Rome was chosen over those of Raphael, Sangallo, and Peruzzi, but an injury forced him to leave the completion of the structure to Antonio di Sangallo.

When Rome was sacked in 1527, Sansovino took up his permanent residence at Venice, where he held for many years the foremost position

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among architects. After completing the restoration of Saint Mark's he was given charge of the Church, Campanile, and Piazza di San Marco. He completed the Scuola della Misericordia, the interior of San Francesco, built the Zecca, the Fabbriche Nuove, and the Loggietta of the Campanile, for which he executed four statues, a David, an Apollo, a Mercury, and a Minerva. From 1536 to 1548 he built the Library of Saint Mark, "the most beautiful profane edifice in Italy." With the high development of his architectural skill went a deterioration of taste in his sculptures and the exaggeration of form, responding no doubt to the demands of the time, made these decorative elements notably out of harmony with the buildings they adorned. In his other buildings, palaces like the Cornaro and Marino on the Grand Canal, and churches like San Giorgio dei Greci and San Giuliano, the tendencies of the Decadence were all exemplified, an overloading of ornament, and an exaggeration of sculptural form that in his followers developed into the extravagant style known as 'baroque.' Consult: Vasari, *Vite* (Florence, 1887); Temanga, *Vita di Sansovino* (Venice, 1752); Rosenberg, in Dohme, *Kunst und Künstler Italiens* (Leipzig, 1879).

SANS-SOUCI, sän'sōō'sē' (Fr., free from care). A royal palace at Potsdam, Prussia, erected by Frederick the Great in 1745-47, where he spent his last years. The unpretentious, one-storied buildings, situated in a splendid park, and adorned with a fine colonnade, contain many personal relics of the King.

SAN STEFANO, sän stā-fä'nō, TREATY OF. See BERLIN, CONGRESS OF; RUSSO-TURKISH WAR.

SANTA ANA, sän'tä ä'nä. The largest city of the Republic of Salvador, situated 28 miles northwest of San Salvador (Map: Central America, C 3). It is the capital of the Department of Santa Ana, is regularly laid out with straight and well-paved streets, and has several fine public buildings. The country is very fertile, and the city is the centre of the sugar trade. It is connected by railroad both with the capital and the port of Acajutla. Population, 33,000.

SANTA ANA. The county-seat of Orange County, Cal., 30 miles south by east of Los Angeles; on the Southern Pacific and the Atchison, Topeka and Santa Fe railroads (Map: California, E 5). It has a public library and the Orange County Teachers' Library, and a fine court-house. The district is engaged extensively in fruit-growing, and has large dairy, nut, and celery interests. Santa Ana is important commercially. Santa Ana was settled in 1870 and was incorporated in 1888. Population, in 1890, 3628; in 1900, 4933.

SANTA ANNA, or **ANA,** ANTONIO LOPEZ DE (1795?-1876). A Mexican general and politician, born at Jalapa. Entering the army at the age of fifteen, he first attracted attention in 1821 as an adherent of Iturbide (q.v.) in the events leading up to the overthrow of the Spanish power. In 1822 he became commandant of Vera Cruz, but on being accused of harboring designs inimical to the Government, turned against Iturbide in December of the same year and headed a rebellion which took shape as the Plan of Casa Mata, and gained support so rapidly that Iturbide hastened to anticipate overthrow by resigning. In 1828 Santa Anna took the field as a partisan of Guerrero, whom he aided in his successful attempt to supplant Pedraza as President. He became, in the following year, Minister of War and commander-in-chief, and in August and September achieved distinction by expelling from the country a Spanish army of invasion, thus ending the last attempt on the part of Spain to reëstablish its authority in Mexico. Personal ambition led him to rise in insurrection against both Guerrero and Guerrero's successor, Bustamante, after whose enforced resignation in 1832, Pedraza, now an ally of Santa Anna, held the chief power for some time. In February, 1833, Santa Anna was chosen President as the chief of the Federalist Party, whose aim was to establish a centralized government in Mexico. Gomez Farias was chosen Vice-President, and to him Santa Anna left the cares of office and the odium of a generally unpopular policy, while he himself retired to his hacienda, whence, however, he kept a close watch on the progress of events. From federalism Santa Anna moved backward toward reaction and monarchism and entered into close relations with the Clericals. This led to republican insurrections, the most formidable of which was suppressed with severity by Santa Anna in 1835. The Texas colonists having undertaken to organize a government of their own, Santa Anna set out to reduce them to obedience. In February, 1836, he attacked San Antonio, and on March 6th captured the Alamo (q.v.). On April 21st, however, General Houston, who was being pursued by Santa Anna, suddenly turned and defeated the Mexican army at San Jacinto (q.v.). Santa Anna was captured, and after promising to exert his influence for obtaining the independence of Texas was allowed to go to the United States, whence he returned in 1837 to Mexico. In November, 1838, he defended Vera Cruz against a French fleet, and, from the loss of a leg in the combat, derived for a time enormous popularity. In the disordered condition of the country many turned to him for a strong leader, and in October, 1841, he became President with dictatorial powers. He ruled entirely in the interests of the Federalist Party till June, 1844, when he was elected Constitutional President. Disaffection was rife, however, and in November an insurrection headed by Paredes led to his overthrow. He was taken prisoner early in 1845 and banished. The threatened war with the United States probably hastened his recall in July, 1846; in December he was made Provisional President, and soon after he took the field against the American forces. On February 22-23, 1847, he was defeated by General Taylor at Buena Vista (q.v.). This was followed by his defeat at the hands of General Scott at Cerro Gordo (q.v.) on April 18th. After the occupation of the City of Mexico by the American army Santa Anna resigned the Presidency, made an attempt to recapture Pueblo, and failing, sailed for Jamaica, whence he went to Venezuela. In 1853 he was recalled and elected President for one year. After a series of intolerable and despotic acts he issued a decree, December, 1853, declaring himself President for life, with the title of Serene Highness. The inevitable rebellion broke out in March, 1854, and after fifteen months campaigning in the Western States, Santa Anna realized the hopelessness of his position and in August, 1855, sailed from Vera Cruz for Cuba. He lived for some time in Venezuela and Saint Thomas, and

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in 1864, during the French invasion, returned to Mexico, where he attempted to play a part in affairs, but was compelled by Bazaine to leave the country. Still striving for political power, he reappeared at Vera Cruz in 1867, but was made prisoner and once more sent into exile. He lived subsequently in the United States, returned to Mexico after the death of Juarez, and died in the City of Mexico, June 20, 1876, poor and neglected. An able soldier and a master of intrigue, with a remarkable capacity for anticipating and manipulating public opinion, Santa Anna enjoyed a longer period of public life than any of his contemporaries in the political vicissitudes of nineteenth-century Mexico. None of the general histories of Mexico contain an adequate treatment of this perplexing personality; Wilson, *Mexico* (New York, 1856), gives a useful contemporary account of the man at the height of his career.

SANTA BARBARA, bär'bä-rä. A town of the department of the same name, Honduras, on the Santiago, 110 miles northwest of the capital, Tegucigalpa (Map: Central America, D 3). In the vicinity are mines of gold, silver, nickel, and zinc. The country produces extensively grain, sugar cane, coffee, cacao, and rice. The town has some manufactures of hats and spirits. It is a place of deposit for Puerto Cortés. Population, about 8000.

SANTA BARBARA. A town of Panay, Philippine Islands, in the Province of Iloilo, situated 11 miles north of Iloilo (Map: Philippine Islands, G 9). Population, estimated, in 1899, 13,000.

SANTA BARBARA. The county-seat of Santa Barbara County, Cal., 100 miles west by north of Los Angeles, on Santa Barbara Channel and on the Coast Line of the Southern Pacific Railroad (Map: California, D 4). Santa Barbara is known as the 'Newport of the Pacific.' It is picturesquely situated on a slope rising gradually from the shore to the old Franciscan Mission, 340 feet above the bay. This mission, the most important and best preserved of the California missions and the only one in which ministrations have never ceased since its founding, was established in 1786. Santa Barbara enjoys a mild, equable climate, owing to peculiar topographical conditions. Important buildings are the Potter Hotel, built in 1902 at a cost of more than a million dollars, the famous 'Los Baños del Mar,' Saint Anthony's College, and the Anna S. C. Blake Sanatorium. The Public Library contains more than 15,000 volumes. The region produces large quantities of beans, English walnuts, lemons, and olives. There are extensive lemon-packing establishments in the city. The government is vested in a mayor and a unicameral council, elected every two years. Santa Barbara was founded as a Spanish presidio in 1782. The city was laid out in 1852, incorporated in 1874, and received its present charter in 1900. Population, in 1890, 5964; in 1900, 6587.

SANTA BÁRBARA DE OCAMPO, dä ō-käm'pō (or simply OCAMPO). A Mexican town of the State of Tamaulipas, 57 miles south of Ciudad Victoria (Map: Mexico, J 6). Its parish church is the second in importance in the State. The region is fertile, producing maize, beans, and tropical fruits. The town was founded in 1749 by the Franciscans. Population, in 1895, 9079.

SANTA BARBARA DE SAMANÁ, sä'mä-nä'. A seaport of Santo Domingo. See SAMANÁ.

SANTA CASA, kä'sä (It., Holy House). A celebrated shrine in Loreto, Italy, said to be the house in which the Virgin Mary lived at Nazareth, miraculously transported to its present site in 1295.

SANTA CATHARINA, kä'tä-rē'nä. A State of Brazil, bounded by the State of Paraná on the north, the Atlantic Ocean on the east, Rio Grande do Sul on the south, and Argentina on the west. Area, 28,624 square miles. The coast is low, but a short distance inland extends the Serra Geral, which exceeds in its highest summits 6000 feet. The climate is hot on the coast and temperate in the elevated interior. Santa Catharina is naturally well adapted for agriculture and stock-raising, but, though the latter is well advanced, the scarcity of population greatly hinders its development. The chief agricultural products are sugar, tobacco, mate, manioc, and corn. Agriculture is encouraged by State bounties. Coal deposits have been discovered in the Serra Geral, and the coal mines have been connected by a railroad with the coast. The population in 1890 was 283,769, including a very large European, chiefly German, element.

SANTA CATHARINA. The capital of the State of Santa Catharina, Brazil. See DESTERRO.

SANTA CLARA, klä'rä. A province of Cuba, occupying the central portion of the island, and bounded by the sea on the north and south, the Province of Matanzas on the west, and Puerto Príncipe on the east (Map: Cuba, E 4). Area, 7524 square miles. The interior is an undulating plateau with a number of detached hills or mountain groups rising in the southeast to a height of about 3000 feet. The southwestern portion consists of the vast swamps known as the Cienaga de Zapata. The north coast is lined with numerous islets. The chief river is the Sagua, the largest on the whole north coast of the island and navigable 20 miles. The province contains some of the largest sugar plantations and factories, while tobacco is also largely raised, and the upland savannas offer rich pasturage. It is also rich in minerals, and asphalt, silver, and copper are mined. Population, in 1899, 356,536. The capital is Santa Clara (q.v.).

SANTA CLARA, or VILLA CLARA. The capital of the Province of Santa Clara, Cuba, situated nearly in its centre on the Cuban main trunk railroad and in a somewhat elevated savanna region (Map: Cuba, E 4). It is a pleasant, well-built town with wide streets. Good tobacco is grown in the district, and there is an asphalt mine producing 10,000 tons annually, while petroleum deposits and graphite, gold, and copper are also found in the neighborhood. Besides the main trunk line to Havana there are railroads running to the ports of Cienfuegos on the south and Sagua la Grande on the north. Population, in 1899, 13,763. Santa Clara was founded in 1664 or 1689. During the revolution, 1895 to 1898, it was an important fortified post of the Spaniards and the centre of active operations.

SANTA CLARA. A town in Santa Clara County, Cal., 47 miles southeast of San Francisco, on the Southern Pacific and the South Pacific Coast Line railroads (Map: California, C

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3). It is the seat of Santa Clara College (Roman Catholic), opened in 1851, and of the Notre Dame Academy. Alameda Avenue, traversing a beautiful country, extends to San José, three miles distant. Santa Clara is situated in a fertile valley engaged chiefly in fruit-growing. Prunes, apricots, peaches, berries, and nuts are produced extensively. Millwork, sashes and doors, windmills, coffins, and leather are manufactured. Green and cured fruits are prepared and shipped in large quantities. The government, under the revised charter of 1874, is administered by a president and a board of trustees, elected respectively for one and two years. Santa Clara was settled in 1780 and incorporated in 1852. Population, in 1890, 2891; in 1900, 3650.

SANTA CLAUS, or **KLAUS,** klạz. See NICHOLAS, SAINT.

SANTA CROCE, krō'chā (It., Holy Cross). A famous church in Florence, formerly belonging to the Franciscans, and the Pantheon of the Florentines. It was begun in 1294 (possibly 1295), after the designs of Arnolfo di Cambio (q.v.), the principal Florentine architect of the period, and was nearly completed before his death (c.1302). In 1320 the first services were held, and in 1442 it was formally dedicated in the presence of Pope Eugenius IV. The graceful, slender tower was completed after the designs of Baccani in 1847, and the unfortunate façade was built in 1857-63. The building is in the Florentine Gothic style; its design and decoration are simple. Santa Croce is a perfect museum of Florentine art of the fourteenth and fifteenth centuries. Especially noteworthy are the celebrated frescoes from the life of John the Baptist and Saint Francis, by Giotto, in the Bardi and Peruzzi Chapels. Other treasures are a "Crucifixion," an "Annunciation," and a bronze statue of Saint Louis of Toulouse by Donatello, and a rich Renaissance pulpit by Benedetto da Majano. Buried within the church are Michelangelo (whose monument is by Vasari), Alfieri (with a monument by Canova), Machiavelli, Galileo, Cherubini, and Rossini. There is also a fine monument to Dante by Stefano Ricci. From Arnolfo's Gothic cloisters adjoining the church is the entrance to what is, perhaps, the most perfect small chapel of the early Renaissance, the Capella dei Pazzi (1420), by Brunelleschi, who also designed the second cloisters of the church. Consult: Moïse, *Santa Croce* (Florence, 1845); Frey, *Loggia de' Lanzi* (Berlin, 1885).

SANTA CRUZ, krōōth. A territory of Argentina, occupying the southern part of Patagonia and bounded by Chile on the west and south, the Territory of Chubut on the north, and the Atlantic Ocean on the east (Map: Argentina, C 13). Area, estimated at from 110,000 to 180,000 square miles. A number of rivers traverse the territory from west to east. Santa Cruz is the least populous portion of the republic, having had a civilized population in 1900 of only 1444. The capital is Gallegos, a village.

SANTA CRUZ. An eastern department of Bolivia, bounded by Brazil on the east, the Bolivian Department of Chuquisaca on the south, Potosí and Cochabamba on the west, and Beni on the north (Map: Bolivia, E 7). Area, estimated at 126,340 square miles. It is covered with great forests in the north, while the southern part belongs to the Llanos de Chiquitos. The northern part of Santa Cruz is drained by the Mamoré. The Rio Grande River, one of its headstreams, is navigable. The climate is hot and unhealthful, but the soil is fertile and yields sugar, coffee, cacao, cotton, rice, and common cereals. There is some cattle-raising, and the forests yield rubber and drugs. Population estimated in 1900 at 210,800, more than half of whom were Indians. Capital, Santa Cruz de la Sierra (q.v.).

SANTA CRUZ. A town of the State of Guanajuato, Mexico, 40 miles southeast of the city of that name, on the Mexican National Railroad. Population, in 1895, 7440.

SANTA CRUZ. The capital of the Province of Laguna in Luzon, Philippine Islands, situated on the eastern shore of the Bay Lagoon, 35 miles southeast of Manila (Map: Philippine Islands, F 5). It has well-built public and ecclesiastical buildings. It has an active trade with Manila by way of the lagoon and the Pasig River, and is noted for the manufacture of palm brandy. Population (estimated), in 1899, 13,141.

SANTA CRUZ, or SAINTE CROIX. The largest of the Danish West India Islands, situated 37 miles south of Saint Thomas (Map: West Indies, P 6). Area, 74 square miles. The surface is hilly in the interior. Along the coasts there are level tracts of fertile soil which produce sugar and rum. Santa Cruz was discovered by Columbus on his second voyage. It was sold by France to a Danish company in 1733. Population (estimated), in 1897, 18,430. Chief town, Christiansted (q.v.).

SANTA CRUZ. The county-seat of Santa Cruz County, Cal., 80 miles south of San Francisco, at the mouth of the San Lorenzo River, on Monterey Bay and on the Southern Pacific Railroad and several steamship lines (Map: California, B 3). It is a watering place of considerable repute. There are the curiously carved cliffs extending for miles along the coast, Sequoia Park, and the celebrated Big Tree forest, a few miles distant. The Public Library contains 15,000 volumes. The leading manufactures are leather, lime, cement, asphalt, gunpowder, and lumber products. The government, under the charter of 1876, is vested in a mayor, chosen biennially, and a unicameral council. On the site of Santa Cruz a Spanish mission of the same name was established in 1791. Population, in 1890, 5596; in 1900, 5659.

SANTA CRUZ, ANDRES (1794-1865). A Bolivian general and politician, born at La Paz in Bolivia. In 1820 he joined the patriots and was promoted to the rank of brigadier-general in 1822 for his services at Pichincha. After the defeat at the Desaguadero he went to Lima, was employed by Bolivar on various diplomatic missions, and was military chief and president of the council of government previous to the election of Lamar as President of Peru in 1827. In 1828 he was elected President of Bolivia for ten years and immediately began to apply his plans for uniting Peru and Bolivia. By 1836 he had so far subjugated Peru that he was appointed by Congress protector of the confederation. Chile, alarmed at these successes, began war against Santa Cruz and defeated him completely at Yungay in 1839.

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SANTA CRUZ DE LA PALMA, dä lä päl'-mä. The capital of Palma, one of the Canary Islands, situated on a bay of the eastern coast of the island (Map: Spain, F 5). It is a thriving commercial town with a good harbor, having shipyards, and ship-building being the chief industry. It exports fruit, wine, cochineal, and tobacco. Population, in 1900, 7383.

SANTA CRUZ DE LA SIERRA, dä lä sē-ĕr'rä. Capital of the Department of Santa Cruz, Bolivia, situated 170 miles northeast of Sucre (Map: Bolivia, E 7). It has a cathedral under construction and a national college with faculties of law, medicine, and theology. There are flour and sugar mills, and a considerable trade with the Indians of the plains. Population, 11,000.

SANTA CRUZ DE NAPO, dä nä'pō. A town of Marinduque, Philippines, situated at the head of a bay on the northeast coast of the island (Map: Philippine Islands, G 6). It has a well-protected harbor with safe anchorage for large steamers, and provided with a stone breakwater 1000 yards long. Population, estimated, in 1899, 15,797.

SANTA CRUZ DE TENERIFE, tä'nä-rē'fä (Eng. *Teneriffe,* tĕn'e-rĭf'). The capital of the Canary Islands, situated at the head of a bay near the northeastern end of the island of Teneriffe (Map: Spain, F 5). It is defended on the seaward side by several forts and is well built, with straight streets and modern houses. The principal square, the Plaza de la Constitución, contains a large monument with a statue by Canova. The principal buildings are the house of the Captain-General, the civil government building, and the hospitals; the town has a high school, a school of navigation, a preparatory academy, a public library, and a museum of natural history. An aqueduct five miles long supplies water from the mountains. The harbor is protected by a breakwater and has good facilities for coaling. Santa Cruz is the second seaport in the Canary Islands. It exports sugar, cochineal, almonds, wine, cattle, and agricultural products. Its population in 1887 was 18,830; in 1900, 35,055.

Santa Cruz was founded by the Spaniards in 1494. It was attacked by an English fleet under Blake in 1657, and by Nelson in 1797; it was in the latter engagement that Nelson lost his arm. The city became capital of the islands in 1822.

SANTA CRUZ ISLANDS. A group of seven large and a number of small islands in Melanesia, in latitude 11° S., longitude 166° E., north of the New Hebrides and southeast of the Solomon Islands (Map: Australasia, J 4). Aggregate area, 356 square miles. The large islands are mountainous and volcanic, the smaller mostly of coral formation. The climate is hot, moist, and unhealthful. The vegetation resembles that of New Guinea, and includes the mangrove, cocoanut, sago-palm, and breadfruit tree. The inhabitants (about 7000) are mostly Melanesians, though in some of the islands Polynesians predominate. They are still uncivilized and hostile to Europeans. The islands are now under the administration of the British High Commissioner for the Western Pacific. They were discovered by Mendaña in 1595.

SANTA FÉ, fā. A province of Argentina, situated in the eastern portion of the Republic and bordered by the Paraná River on the east (Map: Argentina, E 10). Area, 50,916 square miles. The surface is mostly level, well wooded in the northern part, and especially well adapted for agriculture and stock-raising. The chief rivers are the Paraná and its tributary the Salado. The climate is not unhealthful, and the rainfall is sufficient. The agricultural lands are found chiefly along the Paraná, where large plantations are situated. Wheat, corn, flax, and lucerne are the chief agricultural products. There are a number of large industrial establishments, such as flour and saw mills, tanneries, sugar mills, foundries, and brick yards. The railway mileage of the province is the largest in the Republic. Population, in 1900, 536,236. The chief commercial town is Rosario, on the Paraná, and the capital is Santa Fé (q.v.).

SANTA FÉ. The capital of the Province of Santa Fé, Argentina, situated on an arm of the Paraná River at its confluence with the Salado, 95 miles north of Rosario (Map: Argentina, E 10). It is a well-built city, with a modern aspect, and has several lines of street railroads. Its chief institutions are a large Jesuit college, a normal school, and a seminary. Railroads connect it with all the important cities of the Republic, and a short road runs to its port, Colastiné. The chief industry is ship-building, and the principal exports are lumber, wool, and cattle. Population, in 1895, 15,099; of the commune, 24,755.

SANTA FE. The capital of New Mexico, and the county-seat of Santa Fe County, on Santa Fe River and on the Atchison, Topeka and Santa Fe and the Denver and Rio Grande railroads (Map: New Mexico, F 2). The city as originally laid out by the Spaniards has been much changed since the American occupation. The old Spanish buildings which still remain are constructed mostly of adobe. The main business structures centre about the Plaza, upon one side of which is the palace, an edifice where the various Governors of the Territory from the early Spanish times to the present have resided. In the historical museum connected with the palace are early Spanish paintings and interesting remains of the Indian and Spanish periods. Other places of interest are the partially reconstructed Cathedral of San Francisco, the Church of San Miguel, and old Fort Marcy. Santa Fe also has the Capitol, a penitentiary, a Federal building, a hospital, and the Territorial Orphan Asylum. The educational institutions comprise Saint Michael's College, schools for the deaf and dumb, the Loretto Convent, and the Government and Saint Catherine's Indian schools. The most important industries are stock-raising and mining. There are also deposits of kaolin and clay in the vicinity. The government is vested in a mayor, chosen annually, and a unicameral council. Population, in 1890, 6185; in 1900, 5603.

A party of Spaniards visited the site of Santa Fe in 1542 and found there a large Indian pueblo with a population estimated at 15,000. About 1605, the pueblo being then deserted, the Spanish made a settlement here under the name 'La Ciudad Real de la Santa Fé de San Francisco,' enslaved the Indians in the neighborhood, and opened up extensive gold and silver mines. In 1690 the Indians captured the place and expelled the Spaniards, who, however, regained possession

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in 1692. On August 18, 1846, it was occupied, without opposition, by United States troops under General S. W. Kearny. In 1851 it was chartered as a city and became the capital of the newly organized Territory of New Mexico. A trade with Missouri, opened in 1804 and facilitated in 1825 by the improvement of the 'Santa Fe Trail,' became very important subsequent to 1840. Consult: Bancroft, *History of Arizona and New Mexico* (San Francisco, 1884), and a chapter by Hodge in Powell's *Historic Towns of the Western States* (New York, 1901).

SANTA FÉ DE BOGOTÁ, dä bō'gō-tä'. The capital of Colombia. See BOGOTÁ.

SAN'TALS, or **SON'THALS.** A people of Dravidian stock in Western Bengal, Northern Orissa, and Bhagalpur. They are of low stature, and dolichocephalic, with dark skins, and wavy hair. Some of the Santals are good agriculturists; others, in the more remote parts of the country, are still practically in the hunting stage. Except the few who have been converted to Hinduism or to Christianity, the Santals are 'nature-worshipers' with a sun cult and a belief in evil spirits. Their native system of government is village patriarchism. Like the Dravidian Tamils, the Santals have furnished many temporary or permanent emigrants from Hindustan, who have settled in Farther India. The Santals are generally monogamous, although polygamy and polyandry are not at all unknown among them. A grammar of the Santal language has been published (Benares, 1873) by Skrefsrud, and a collection of "Traditions and Institutions of the Santhals," written down from the dictation in Santali of Kolean Haram, an old Santal, appeared at Benagoria in 1887. Consult: Man, *Sonthalia and the Sonthals* (London, 1867); Dalton, *Descriptive Ethnology of Bengal* (Calcutta, 1872).

SANTA MARGHERITA LIGURE, mär'gä-rē'tä lē-gōō'rä. A seaport and bathing resort in the Province of Genoa, Italy, 15 miles east-southeast of Genoa (Map: Italy, D 3). Coral fisheries are carried on and there are manufactures of olive oil and rope. Population (commune), in 1901, 7169.

SANTA MARÍA, mä-rē'ä. A town of Northern Luzon, Philippine Islands, in the Province of Iloco Sur, situated two miles from the coast and 11 miles southeast of Vigan, on the highroad and projected railroad from Manila to Laoag (Map: Philippine Islands, E 2). Population, estimated, in 1899, 10,030.

SANTA MARÍA, DOMINGO (1820-90). A South American politician, born in Santiago de Chile. He was obliged to leave Chile because of his share in the events of 1850-51 and was again exiled in 1858. Upon his return to Chile he held the positions of Minister of Finance (1863-64), envoy to Peru, judge of the Supreme Court (1868), and president of the Court of Appeals (1874). He was a member of President Pinto's Cabinet, with the portfolios of Foreign Affairs, the Interior, and War, and was President of the Republic in 1881-86, when he again became president of the Court of Appeals. Many of the present railroads were built during his administration, the Araucanian Indians were brought into subjection, and the disputes with Peru arranged on a more secure peace basis. His works include *Biografía de José Miguel Infante* (1853) and *Memoria historica sobre la abdicación del director Don Bernardo O'Higgins* (1858).

SANTA MARIA CAPUA VETERE, kä'pōō-ä vä'tä-rä. A city of South Italy, in the Province of Caserta, 15 miles north of Naples, located on the site of ancient Capua, of whose stones it was partly rebuilt (Map: Italy, J 6). It is an active, thriving, attractive place, with a population of 22,146 (commune) in 1901. Its large, reconstructed cathedral, dating from 1766, has five naves and 52 columns. The Roman ruins attract many sight-seers. Ancient Capua, in Campania, was second only to Rome among the cities of Italy in wealth and population. Under the name of Volturnum it was the chief of the twelve cities said to have been founded by the Etruscans in this part of Italy. In B.C. 343 it formed an alliance with Rome for protection against the Samnite tribes of the mountains. After the battle of Cannæ, B.C. 216, the popular party opened the gates to Hannibal, whose army rapidly degenerated here under the new corrupting surroundings. The Romans obtained possession of the city in B.C. 211. In the fifth century A.D. Capua was devastated by the Vandals under Genseric. It recovered its prosperity again to some extent, but was totally destroyed by the Saracens in 840. Among the antiquities one of the most remarkable is the amphitheatre constructed of travertin, of which well-preserved arches, corridors, and seats for spectators still remain.

SANTA MARIA DEL FIORE, dĕl fē-ō'rä. The *Duomo* or cathedral of Florence (q.v.).

SANTA MARÍA DE PANDI, pän'dē. A town of Luzon, Philippine Islands, in the Province of Bulacán, situated near the Manila-Dagupan Railroad, nine miles east of Malolos (Map: Luzon, E 7). It was a handsome and well-built town, but, as it was used as a military centre by the insurgents, it was burned by the American troops and now consists chiefly of nipa huts. Population, estimated, in 1899, 10,508.

SANTA MARIA MAGGIORE, mäd-jō'rä. One of the oldest churches in Rome, reputed to have been built about 352 by Pope Liberius and reërected in the fifth century. Old marble columns and mosaics of this date are preserved in the nave, also fine fifteenth-century mosaics of the Coronation of the Virgin. Over the altar in the Borghese Chapel is an old picture of the Virgin ascribed to Saint Luke. This is one of the five 'patriarchal churches' and derives its name of Saint Mary Major from its importance among the eighty churches in Rome dedicated to the Virgin.

SANTA MARTA, mär'tä. The capital of the Department of Magdalena, Colombia, on the Caribbean coast, 45 miles east of the mouth of the Magdalena River (Map: Colombia, C 1). It has a cathedral, and is a port much frequented by vessels plying among the Antilles. Population, about 6000. Santa Marta was founded in 1525. It was long an important centre of exploration and conquest and was repeatedly sacked and several times entirely destroyed by pirates and Indians. Near the town is the hacienda where Simon Bolivar died in 1830.

SANTA MAURA, mou'rä, or LEUCADIA (Mod. Gk. *Levkas*). One of the Ionian Islands, belonging to Greece, off the west coast of Acar-

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nania, from which it is separated by a passage about a mile wide (Map: Greece, B 3). Area, 109 square miles. It is traversed from north to south by a range of hills which end at the southern extremity in high white cliffs. The inhabitants, who numbered 31,769 in 1896, are engaged chiefly in fishing and the manufacture of salt. Chief town, Amaxichi (q.v.).

SANTANA, sän-tä'nä, PEDRO (1801-64). A President of Santo Domingo, born at Hineha. In 1844, when Juan Pablo Duarte rebelled against Haitian rule, Santana inflicted upon the Haitians a crushing defeat at Azua that practically decided the war. Soon afterwards he was proclaimed supreme chief of the Dominican Republic, and upon the organization of a regular government he was elected its first President. In 1848 he was succeeded by Jimenes. At the time of the Haitian invasion under Soulouque (See FAUSTIN I.), in 1849, Santana with a force of scarcely 400 routed Soulouque's force of 4000. He then defeated Jimenes and for a time ruled as dictator. In 1853 he was again elected chief magistrate. During this administration he repelled another invasion of the Haitians. In 1856 he was deprived of power and succeeded by Baez. In 1858, however, Baez was driven into exile and Santana again became President. In March, 1861, practically on his own authority, he ceded Santo Domingo to Spain. He was appointed Captain-General, but soon resigned. In August, 1863, when an illiterate peasant organized the rebellion which finally swept the Spaniards from the island, Santana went to the city of Santo Domingo and offered his services in vain to the Spanish authorities. His death occurred only a few months before Spain acknowledged the regained independence of Santo Domingo.

SANTANDER, sän'tän-dâr'. The capital of the Province of Santander in Old Castile, and one of the principal seaports of Northern Spain. It is charmingly situated on the north shore of a land-locked inlet of the Bay of Biscay (Map: Spain, D 1). There are few buildings of interest except the old Gothic cathedral dating from the thirteenth century. The town has a provincial high school, a normal and a nautical school, and a theological seminary. On the beach of Sardinero are hotels and bathing establishments. The fisheries are important, and there are salting and pickling establishments, sugar and oil refineries, iron foundries, and manufactures of glass, candles, soap, perfumes, sulphuric acid and other chemicals, and cotton goods. The harbor is spacious and deep and provided with ship yards and extensive wharves, accessible for the largest ships and recently improved and enlarged. The chief exports are iron ore, of which 406,996 tons were exported in 1898, preserved food, flour, paper, wine, and manufactured articles. Population, in 1887, 42,125; in 1900, 54,346.

SANTANDER. A department of Colombia, South America, bounded by Venezuela on the north (Map: Columbia, C 2). Area, 16,409 square miles. It is traversed by the Eastern Cordillera of the Andes, and the greater part of its surface is mountainous. In the plains along the Magdalena are cultivated sugar, cacao, coffee, tobacco, and cotton. Gold, silver, and other minerals are mined to some extent. The population was estimated in 1896 at 560,000. Capital, Bucaramanga (q.v.).

SANTANDER, FRANCISCO DE PAULA (1792-1840). A South American statesman, born at Rosario de Cúcuta, New Granada. Immediately upon the proclamation of independence in 1810 Santander joined the patriots and fought under Nariño and Bolivar, and was on Bolivar's staff in 1817-18. He was promoted to the rank of general of divison at the battle of Bozaca in 1819 and was appointed by Bolivar Vice-President of the State of Cundinamarca, and in 1821 was elected Vice-President of Colombia. He was reelected in 1827, and during Bolivar's repeated absences ruled the country with wisdom and decision. Afterwards he opposed Bolivar and was condemned to death for supposed complicity in a conspiracy to murder him. Santander's sentence was changed to exile, and he remained abroad until his election to the Presidency of New Granada in 1832. His administration was beneficial, and after his term ended in 1836 he was twice elected to Congress. He wrote *Apuntamiento para las memorias de Colombia y Nueva Granada* (1837).

SANT' ANGELO, CASTLE OF. See HADRIAN, TOMB OF.

SANTAREM, sän'tä-rän'. A river-port of Portugal, capital of the District of Santarem, on the right bank of the Tagus, 40 miles northeast of Lisbon (Map: Portugal, A 3). It carries on an active trade in wine and olive oil with Lisbon. Population, in 1900, 8704. Santarem was formerly an important fortified place.

SANTAREM. A town of the State of Pará, Brazil, 440 miles west of the city of that name, on the right bank of the Tapajós, near its confluence with the Amazon (Map: Brazil, G 4). It controls the rubber trade of the Tapajós. The rich agricultural and pastoral region also produces cacao. Near Santarem is an agricultural colony composed of emigrants from the Southern United States. Population, in 1889, about 4500.

SANTA RITTA DURÃO, sän'tä rit'tä dōō-roun', JOSÉ DA (1737-84). A South American poet, born near Marianna, Minas Geraes, Brazil. He studied in the Jesuit College at Rio de Janeiro and at the University of Coimbra, and entered the Order of Saint Augustine at Leira. Afterwards he lived in Rome and about 1778 returned to Coimbra as professor of theology, and prior of his Order. His most important work is the epic *Caramurú* (1781), a description of the discovery and colonization of Bahia by Diego Alvares.

SANTA ROSA, sän'tä rō'sä. A town of the department of the same name, Guatemala, 30 miles southeast of the capital. It is an extensive live-stock centre and the district produces sugar, coffee, and grains. Its climate is far from salubrious, since undrained areas are near. Population, about 6300.

SANTA ROSA. The capital of the Department of Copán, Honduras, 150 miles northwest of Tegucigalpa (Map: Central America, C 3). It has a college. Gold, silver, and copper mines are near; tobacco, coffee, sugar, and grain are produced in abundance. Population, about 6700.

SANTA ROSA. The county-seat of Sonoma County, Cal., 52 miles north of San Francisco, on the Southern Pacific and the California Northwestern railroads (Map: California, B 2). It is the seat of the Pacific Methodist College (Meth-

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odist Episcopal, South), opened in 1861, and of the Ursuline Academy of the Sacred Heart. Among other features are the public library, city hall, and court house. The adjacent country is noted for its extensive fruit-growing and nursery interests. The city is engaged largely in wine-making and fruit-canning and in the manufacture of leather, woolen goods, flour, lumber products, etc. Large basalt quarries are worked in the vicinity. Canned goods, fruit, wine, hops, grain, hay, cattle, flour, wool, and leather constitute the principal shipments. The government is vested in a mayor, chosen every two years, and a unicameral council. Population, in 1890, 5220; in 1900, 6673.

SANTA ROSA DE LOS OSOS, dâ lôs ō'sôs. A town of the Department of Antioquia, Colombia, near the Cauca, 170 miles northwest of Bogotá. It is in the vicinity of rich gold deposits, but antiquated methods are employed in working them. Its high altitude (8560 feet) gives it a genial and healthful climate. Population, in 1892, 10,059.

SANTA ROSALÍA, rō'sâ-lē'â. A town of the State of Chihuahua, Mexico, 80 miles southeast of the State capital, on the Mexican Central Railway (Map: Mexico, F 4). It is celebrated for its hot sulphur baths. Population, about 8000.

SANTA TECLA, tĕk'lâ, or NUEVA SAN SALVADOR. A town of the Republic of Salvador, eight miles southwest of the capital, San Salvador, in a picturesque valley at the foot of the volcano of the same name (Map: Central America, C 4). The town is well built, with broad, straight streets and notable public edifices such as the hospital, municipal building, and the Concepción and Carmen churches. Its *plaza de armas* is the most beautiful in the Republic. Santa Tecla was founded in 1854 after the destruction of San Salvador by an earthquake. The attempt to make this the capital was not successful. Its population in 1890 was 13,715.

SANTAYANA, sän'tâ-yä'nâ, GEORGE (1863—). An American poet, educator, and philosopher, of Spanish parentage, born in Madrid. He was graduated from Harvard College in 1886, where he became instructor and assistant professor in philosophy. His first volume of verse, entitled *Sonnets and Other Poems*, appeared in 1894, and was remarkable for the depth of thought and finished quality of the verse. In 1896 he published *The Sense of Beauty*, an inquiry into the physical and psychological causes for the æsthetic sense in man; in 1898 appeared *Lucifer, a Theological Tragedy;* in 1900 a volume of essays entitled *Interpretations of Poetry and Religion;* and in 1901 *The Hermit's Christmas and Other Poems.*

SANTEE'. The chief river of South Carolina. It is formed near the centre of the State by the junction of the Congaree and Wateree or Catawba, both of which rise in the Blue Ridge in North Carolina (Map: South Carolina, D 3). The combined stream flows southeast and enters the Atlantic Ocean by two arms south of Winyah Bay. It is 150 miles long to the junction, and 450 miles to the source of the Catawba. Steamers can navigate to Columbia on the Congaree and to Camden on the Wateree.

SANTERAMO IN COLLE, sän'tâ-rä'mô ên kôl'lâ. A town in the Province of Bari, Italy, 23 miles southwest of Bari (Map: Italy, L 7). It markets cereals, wine, fruit, and cattle. Population (commune), in 1901, 13,662.

SANTERRE, sän'tĕr', ANTOINE JOSEPH (1752-1809). A French revolutionist, born in Paris. In 1789 he was the owner of a large brewery in the Faubourg Saint-Antoine. At the outbreak of the Revolution he commanded a battalion in the National Guard; took part in the storming of the Bastille, and became a fierce Jacobin. He stirred up the *émeute* of the Champ de Mars in 1791 and led in the events of June 20 and August 10, 1792. As commander of the National Guard he was present at the trial and execution of Louis XVI., whose last words he ordered the drums to drown. Made general of division in 1793, he led an army against the Vendéans, but was beaten. He was arrested and imprisoned till the fall of Robespierre. After the institution of the Directory he lost all prominence.

SANTI, sän'tê, GIOVANNI (c.1435-94). An Italian painter and poet, father of Raphael. He was born in Colbordolo, in the Duchy of Urbino, was a petty merchant for a time, then studied under Piero della Francesca, and seems to have been an assistant of Melozzo da Forli. He painted several altar-pieces, two now in the Berlin Museum; a Madonna, in the Church of San Francesco, in Urbino; one at Santa Croce in Fano; one in the National Gallery at London; and another in the gallery at Urbino; an Annunciation at the Brera in Milan; and a Jerome in the Lateran. His poetry includes an epic in the honor of the Duke of Urbino and a long discourse on painting. Consult Schmarsow, *Giovanni Santi* (Berlin, 1887), in which quotations and summaries of his poems are given and a very sympathetic criticism of his simple style, chill coloring, and graceful treatment of the figure.

SANTIAGO, sän'tê-ä'gô (SÃO THIAGO). The largest and most important of the Cape Verde Islands (q.v.).

SANTIAGO. A central province of Chile, bounded on the east by Argentina, on the west by the Pacific, on the south by the provinces of O'Higgins and Colchagua, and on the north by Valparaiso and Aconcagua (Map: Chile, C 10). Area, 5223 square miles. It is traversed in the east and west by mountain ranges inclosing a central valley. It is but scantily watered and agriculture is possible only by irrigation. Mineral deposits and springs occur in several parts of the province, and large quantities of salt are obtained from the lagoons on the coast. Population, in 1895, 415,636. Capital, Santiago.

SANTIAGO, or SANTIAGO DE CHILE. The capital of Chile and of the Province of Santiago, situated on a small tributary of the Maipo in the central valley between the coast range and the Andes, 68 miles southeast of Valparaiso (Map: Chile, C 10). The location is extremely romantic, being surrounded by mountains on all sides. On the east tower the snow-clad Andes, some of whose loftiest summits, including Aconcagua, are in plain sight. Several hills rise within the city, such as the steep red porphyry crag of Santa Lucía, about 200 feet high, on which the first settlers withstood a six years' siege by the fierce Araucanian Indians. It is now laid

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out as a public park; there are several large parks within and around the city, in which irrigation maintains a luxuriant vegetation, although the rainfall is very scanty and the surrounding plains are naturally arid. The houses are generally built in the old Spanish style, one or two stories high, with a central patio, and often with extensive gardens.

Santiago is the most populous city on the entire western slope of America, with the exception of San Francisco. An extensive system of street railroads traverses the city in all directions. During the last two or three decades numerous large buildings, several stories high and of solid stone construction, with artistic façades, have been built, including many sumptuous private residences. The streets are exceptionally well paved, clean, and broad. The Alameda or Avenida de las Delicias, which divides the city into two halves, is one of the finest boulevards of South America. It is more than 300 feet wide, lined with several rows of poplars, and ornamented with fountains and statues, many of the latter being the spoils of the Peruvian war. The prominent buildings are the large mint, the Exposition Palace, the Hall of Congress, a magnificent opera house, the cathedral, and the university building. The university, the head of the educational system of the country, was founded in 1743, and has faculties of law, philosophy, medicine, and science, with over 1000 students. Other educational institutions are the Pedagogical Institute; the National Library, containing in 1897 101,000 volumes; the National Museum, one of the foremost in South America; normal, military, trade, and agricultural schools; an astronomical observatory; and a botanical garden. The industries are unimportant, but there is some trade, chiefly in the hands of foreigners. Santiago is connected by railroad with Valparaiso, Concepción, and Buenos Ayres. Population, in 1885, 189,392; in 1900, 269,886. Santiago was founded in 1541 by Pedro de Valdivia.

SANTIAGO, Battle of. See Spanish-American War.

SANTIAGO, Rio Grande de, or Rio Santiago. The largest river in Mexico. It rises in a small lake at the foot of the volcano of Toluca, near Mexico City, and flows under the name of Rio Lerma first northwest, then west through the States of Mexico and Guanajuato, emptying into Lake Chapala (q.v.), on the boundary between Michoacán and Jalisco. Issuing from the north end of the lake as the Rio Santiago, it flows northwest through Jalisco and the Territory of Tepic, and empties into the Pacific Ocean near San Blas. Its total length is about 550 miles. In its upper course it has a very swift current, and below Lake Chapala it breaks through the Sierra Madre in deep and rocky gorges, where it is obstructed by reefs and falls. In its extreme lower course it is very shallow, so that no part of it is permanently navigable.

SANTIAGO DE COMPOSTELA, dā kŏm-pō-stā'lā, or Compostella. A celebrated town of Galicia, Northwestern Spain, in the Province of La Coruña, situated among the mountains 28 miles south of Corunna (Map: Spain, A 1). Tradition ascribes its origin to the finding in the ninth century of the remains of the Apostle Saint James (Santiago), the patron saint of Spain. According to the legend the spot was pointed out to Bishop Theodomir by a star, whence the place was called 'Campus Stellæ' (field of the star), later corrupted to Compostela. A church was built over the grave, which became the goal of vast numbers of pilgrims. The church was destroyed by the Moors in 997, and in 1082 the present cathedral was begun. It is a vast cruciform granite structure, and the best example of the early Romanesque architecture in Spain. The façade, which dates from 1738, is very elaborately decorated in baroque style. The crypt contains the shrines of the Apostle and his two disciples. The city, which is the see of a metropolitan archbishop, contains several other churches and a large number of convents and other ecclesiastical buildings, some of which, such as the convents of San Francisco and San Martin, are of great size. The large Hospital Real, opposite the cathedral, was built in 1501 by Ferdinand and Isabella for the reception of pilgrims, who are still numerous. There are a university, founded in 1504, and several academies. Population, in 1900, 24,917.

SANTIAGO DE CUBA, dā kōō'bā. The largest province of Cuba, occupying the eastern end of the island, bounded on the northwest by the Province of Puerto Príncipe and surrounded on the other sides by the sea (Map: Cuba, J 6). Area, 12,468 square miles. This is the highest and most mountainous part of Cuba. The mountains are divided by the valley of the Canto, the largest river of Cuba, which traverses the province from east to west. Along the south coast runs the well-defined range of the Sierra Maestra, rising in the Pico de Turquino to a height of 8320 feet. In the east the range merges with the northern mountains in a wilderness of hills, ridges, and precipices. There are numerous fertile valleys in the province, yielding all the agricultural products of the island, and the mineral wealth is extensive, consisting especially of copper, and including also iron, mercury, and marble. The chief industries are mining, sugar and tobacco manufacture, cattle-raising, and the exploitation of the forests, which yield fine cabinet woods. Population, in 1899, 327,715. The capital is Santiago de Cuba.

SANTIAGO DE CUBA. The capital of the province of the same name in Cuba, and the second city of the Republic in size and importance. It lies at the northeastern end of the Bay of Santiago, on the southeastern coast of the island, 470 miles in a straight line southeast of Havana (Map: Cuba, K 6). The bay is a harbor of the first class, very deep and capacious, and completely land-locked. It is 5 miles long, with an average breadth of 1½ miles, and has an extremely narrow entrance, in one place only 220 yards wide. The entrance is protected by the fortresses of Morro and Socaba, which crown the rocky cliffs, but are more picturesque than formidable. Within the entrance are the Batería de la Estrella and several minor defenses. The bay and the city are inclosed by mountains which cut off the sea breezes and render the location hot and unhealthful. The mean temperature in summer is 88° and in winter 82°. The city is built on a sloping amphitheatre of hills, with generally crooked and hilly streets and one-storied houses. Previous to the American occupation the streets were badly paved and unclean, while yellow fever was prevalent, but

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these conditions are now very greatly improved. Water is brought to the city by an aqueduct, but the supply is irregular. The best street is the broad and level Calle de Christina, running along the water front. The Plaza de Armas, which has four parterres planted with trees, is surrounded by some of the best buildings in the city, including the Government palace and the cathedral. The latter is one of the oldest and largest churches in the island. The Government palace, theatre, market, military hospital, and the Hospital de Caridad are modern buildings, the last mentioned being one of the best in the city. The industries are largely dependent on the rich mining districts in the neighborhood. Copper and manganese are mined, but the iron mines are the most extensive, employing 4000 hands, and producing monthly nearly 50,000 tons of ore for export to the United States. In the city are iron foundries and machine shops, and also a number of tobacco factories. The commerce is very extensive both with foreign countries and with the remainder of Cuba. The domestic trade, which until then was carried on chiefly by coasting steamers, was afforded additional facilities by the completion in 1902 of the Cuban main trunk railroad traversing the whole length of the island from Havana to Santiago. The exports are tobacco, coffee, sugar, iron ore and manganese, and cabinet woods. Population, in 1899, 43,090.

Santiago was founded in 1514 by Diego Velasquez. It was soon after made the capital of Cuba, which it remained for about a century. In common with other towns on the Spanish Main, it suffered many vicissitudes from pirates and hostile fleets. In the Spanish-American War of 1898 it became the chief objective point of the American attack on account of the fact that the Spanish fleet under Admiral Cervera had taken refuge in the harbor. The city was invested by the American army under General Shafter and by a blockading squadron under Sampson. The heights of El Caney and San Juan, in front of the town, were stormed on July 1st; the fighting continued on the 2d; on July 3d the Spanish fleet, attempting to escape, was destroyed outside the harbor entrance; and on July 14th the commanding general, Toral, capitulated, the formal surrender taking place on July 17th. See SPANISH-AMERICAN WAR.

SANTIAGO DE CUBA, SOCIETY OF THE ARMY OF. An hereditary military association, organized in Santiago de Cuba on July 1, 1898, and completed at Camp Wickoff, Montauk Point, Long Island, on September 15, 1898, by the adoption of a constitution and the election of officers. It has for its object to preserve the memory of the events of the campaign which resulted in the capture of Santiago on July 17, 1898. It admits to membership all those officers and soldiers of the United States army who constituted the expeditionary force to Santiago de Cuba, and who worthily participated in the campaign between the dates of June 14 and July 17, 1898. The insignia consists of a badge pendant from a ribbon. The badge is in the form of a Maltese cross. The colors of the ribbon are those of Spain, yellow and red. The motto of the society is, "As he died to make men holy, let us die to make men free." The membership is about 3500.

SANTIAGO DE LAS VEGAS, dä lȧs vā'gȧs. A town of Cuba, in the Province of La Habana, situated in a healthful location 8 miles south of Havana (Map: Cuba, C 3). Its leading industry is the manufacture of tobacco. Population, in 1899, 7151.

SANTIAGO DEL ESTERO, ĕs-tā'rō. A province of Argentina, bounded on the north by El Chaco, on the east by Santa Fé, on the south by Córdoba, and on the west by Catamarca and Tucumán (Map: Argentina, E 9). Area, 39,764 square miles. With the exception of the western part, which is somewhat mountainous, the surface of the province is generally level, and is very largely covered with forests, though the southern part consists more of open pampas, and takes in a portion of the Salinas Grandes. It is watered by the Saladillo and the Salado, and has a fertile soil. Lumbering is the chief industry, and there are a large number of steam saw-mills. Agriculture and stock-raising are also important. Population, in 1900, 180,612. Capital, Santiago del Estero.

SANTIAGO DEL ESTERO. The capital of the province of the same name, in Argentina, situated on the river Dulce, on the railroad lines from Tucumán to Córdoba and Santa Fé (Map: Argentina, E 9). It has a national college and a normal school, but has declined in importance. Population, in 1895, 9817. It was founded in 1552, being the oldest town in the Republic.

SANTIAGO DE LOS CABALLEROS, dȧ lōs kä'bȧ-lyā'rōs. A town of the Republic of Santo Domingo, on the right bank of the Yaquí River, 24 miles south of Puerto Plata, with which it has railway connection (Map: Antilles, M 5). It is situated in the midst of the most fertile and healthful valley of the Republic, known as the Vega Real, and is the largest town of the interior, with a flourishing trade in tobacco. Population, about 10,000.

SANTILLANA, sän'tē-lyä'nȧ, IÑIGO LÓPEZ DE MENDOZA, Marqués de (1398-1458). A noted Spanish soldier, poet, and scholar, born at Carrion de los Condes, Old Castile, the son of an admiral and nephew of the Grand Chancellor Pedro Lopez de Ayala. From early manhood a prominent figure at the Court of Juan II. of Castile, he was invested with the Marquisate of Santillana for his successful campaign against the Moors of Granada, in 1437-39, and was created Count of Real de Manzanares for his part in deciding the battle of Olmedo (1445). He joined the conspiracy which brought about the downfall of the favorite Alvaro de Luna, in 1453, but after 1454 took less and less part in public affairs, devoting himself chiefly to literary pursuits, and died at Guadalajara. While not an original genius, Santillana was an extremely skillful versifier, gifted with unusual imitative powers which enabled him to reproduce with great felicity the characteristics of the most dissimilar writers. He contributed much toward the transformation of Castilian poetry after classical Italian and courtly Provençal models and was the first in Spain to compose sonnets in imitation of Petrarch. These are, however, of prevalently historical interest, while genuine lyrical charm pervades his *Serranillas* (pastorals), of which the song of the "Vaquera de la Finojosa" attained the widest popularity. Among his didactic poetry are to be especially noticed the

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Proverbios or *El Centiloquio* (1449), a collection of one hundred proverbs in eight-line stanzas; the *Diálogo de Bias contra Fortuna* (1448); and the *Doctrinal de privados* (1453). The dream-dialogue *Comedieta de Ponza* is an allegorical poem in Dantesque manner, founded on the disastrous naval combat off Ponza, in 1435, in which the kings of Aragon and Navarre and the Infante of Castile were taken prisoners by the Genoese. Santillana's complete *Obras* were edited by Amador de los Rios (Madrid, 1852). Consult Ticknor, *History of Spanish Literature*, i. (Boston, 1872).

SANT'LEY, CHARLES (1834—). An English barytone singer, born in Liverpool. He studied singing in Italy, later with Garcia in London, and appeared on the stage first in 1857. In 1859 he married Gertrude Kemble, a well-known soprano. He was for a few years with the Carl Rosa Opera Company, but his greatest successes came on the concert and oratorio platform. He toured with great success in America in 1871 and 1891, in Australia in 1889-90, and in Cape Colony in 1893. In 1892 he published *Student and Singer*. His ballads, songs, and church music are well known.

SANTO DOMINGO, sän'tô dô-mên'gô, or DOMINICAN REPUBLIC. A republic in the West Indies occupying the eastern and larger part of the island of Haiti (q.v.), with an estimated area of over 18,000 square miles (Map: West Indies, M 5). Through the centre of the western part of Santo Domingo extend the Cordilleras del Cibao, which form the backbone of the island. Through the eastern part stretches the Muertos range. Though mountainous, the whole region, which is richly forested, lends itself readily to tillage. The numerous small plains are traversed by navigable rivers, and are unsurpassed for fertility. The principal product is sugar, which is cultivated on extensive plantations, but largely by foreign capitalists. Cacao, coffee, and bananas are also grown extensively, and there are valuable forests of mahogany. Of late there has been some attempt to increase the cotton output, and American capital has been invested in the exploitation of the rich mineral resources, which comprise iron, gold, copper, coal, salt, and a few other minerals.

The commerce is very small, considering the vast natural resources of the Republic. The imports were $2,246,000 in 1897 and $2,986,921 in 1901, and the exports $3,568,000 in 1897 and $5,224,000 in 1901. The chief exports are sugar, cacao, coffee, mahogany, tobacco, bananas, and animal products. Over 60 per cent. of the trade is with the United States. The chief ports are Santo Domingo, Sanchez, and Puerto Plata. The communication and transportation facilities are utterly inadequate. There are altogether about 130 miles of railway lines connecting the ports of Sanchez and Puerto Plata with the interior. The Constitution of Santo Domingo, adopted in 1844, and repeatedly modified since then, provides for a President elected indirectly for four years and assisted by an appointed Cabinet. The legislative power is vested in a National Congress consisting of twenty-four deputies, elected for two years, by restricted suffrage. The governors of the provinces, the prefects, and magistrates are appointed by the President. The finances of the Republic are in a deplorable state. The revenue is derived almost exclusively from customs duties, and the budget balances at something over $2,000,000. The foreign debt amounted in 1902 to over $18,900,000 and the internal debt to $2,845,550 gold and $10,126,629 silver. The standard of value is the gold dollar of the United States, adopted in 1897, but the actual circulation is composed of depreciated paper and debased silver. The Roman Catholic religion is recognized by the State. Primary instruction is obligatory and gratuitous, and a number of secondary schools are maintained by the State. The Republic maintains a small standing army and a navy of three small gunboats. The population, estimated at 500,000, is composed principally of a mixed race of Spanish and aborigines, mulattoes and negroes. The predominating language is Spanish. The capital is Santo Domingo.

HISTORY. The history of Santo Domingo forms a part of that of Haiti (q.v.) till 1844. In February of that year the inhabitants of the Spanish part of the island proclaimed their independence under the leadership of Don Pedro Santana, who became first President of the Dominican Republic. He was followed in 1848 by the creole Jimenez, whose weak rule invited an attack by Faustin I. (Soulouque), Emperor of Haiti. Santana was made dictator and defeated Faustin at Ocoa, April 21, 1849. Another attempt by the Haitian ruler in the following year met with a like result. Buenaventura Baez, who was chosen President in 1849, was succeeded in 1853 by his rival Santana, who held power till 1856, in which year he repelled a third invasion from Haiti. He was succeeded by Baez, but in 1858 he regained power and ruled absolutely until 1861. In that year he proclaimed the annexation of Santo Domingo to Spain, and his action was at first acquiesced in by the people. The harshness of the Spanish rule, however, led to an insurrection in 1863, headed by José Maria Cabral, who in December, 1864, defeated the royalist forces near La Ganela. In May, 1865, Spain acknowledged the independence of the Republic. Baez was chosen President, but was driven out in 1866 and was succeeded by Cabral. The latter in turn had to flee in 1868, and Baez once more held power till 1873. During his administration occurred the negotiations with the United States looking toward the annexation of Santo Domingo, a favorite project with certain politicians in the United States since the early forties. During the early part of President Grant's administration, General O. E. Babcock was sent by the President to inquire into the conditions of the island and its resources. While there he negotiated a treaty of annexation (November 29, 1869), by which, on payment by this Government of $1,150,000, the Dominican Republic was to become part of the United States. The treaty was ratified by the Dominican people, but met with bitter opposition in the United States Senate, and was finally rejected by a tie vote. A Congressional commission visited the island in 1871 and presented an exhaustive report entirely favorable to annexation. It was laid before Congress by the President, but no action was taken upon it. The Dominican Government renewed its overtures in 1874, but met with no success. After the Presidency of Gonzales (1873-79) there came a period of disturbed politics. In 1884 Ulisse Heureaux was chosen President, and after two years again obtained office. He ruled with reso-

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lution and reëstablished order, but perished by assassination in October, 1899. He was succeeded by Jimenez, who in turn was driven out by General Vasquez in 1902.

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SANTO DOMINGO. The capital of the Republic of Santo Domingo, situated on the south coast, at the mouth of the Ozama (Map: West Indies, M 5). The city is regularly built, but its streets are unpaved. It is still surrounded by picturesque walls, and contains interesting remains from former times, such as the ruins of large and well-built stone mansions, contrasting strangely with the present straw-thatched dwellings. There is a large Gothic cathedral, which was the resting place of the bones of Columbus until 1796, when what was believed to be the body of the discoverer was transferred to Havana, though the Dominicans claim that it still rests in their cathedral. A large statue of Columbus stands in the principal square. Other buildings and institutions worthy of mention are a former Jesuit college, a normal school, two hospitals, an arsenal, and barracks. The district is fertile. The city exports much sugar and coffee. Its harbor, however, is an open and dangerous roadstead, and the river is accessible only to very small vessels. Population, 25,000. Santo Domingo is the oldest European settlement in America, having been founded by Bartholomew Columbus in 1496.

SAN'TONIN (from *santon-ic*, from Lat. *Santonicus*, relating to the Santoni, from *Santoni*, a people of Aquitania; especially the *Santonicum absinthium*, Santonic wormwood, also called *Santonica herba*, Santonic herb, which abounded in Aquitania), $C_{15}H_{18}O_3$. A neutral vegetable principle obtained from *santonica*, the unexpanded flower-heads of *Artemisia pauciflora*, a perennial plant of the order Compositæ, growing in Persia and Asia Minor. Santonin is colorless, odorless, crystalline, practically insoluble in water. It is one of the most efficacious of the class of medicines known as anthelmintics or vermicides for roundworms. Two peculiar symptoms occur after the administration of santonin. The urine often acquires a reddish tint, which may give rise to an unfounded suspicion of the presence of blood in that fluid; and under its influence vision becomes remarkably affected for a few hours, every object appearing either yellow or green, red, blue, or violet. This change may come on suddenly. It passes off, leaving no ill effects.

SANTORIN, sän'tō-rēn' (Anc. *Thera;* Mod. Gk. *Thira*). An island in the Ægean Sea belonging to the Greek nomarchy of the Cyclades (Map: Balkan Peninsula, E 6). It is situated 30 miles south of Naxos, and 120 miles east of the southeastern extremity of the Morea, and has an area of 27 square miles. It is crescent-shaped, forming with two smaller islands the edge of an ancient crater now occupied by a circular sheet of water into which the coasts fall precipitously to a great depth. The island consists chiefly of volcanic material and rises in the volcano of Hagios Ilias to a height of 1916 feet. Within historical times several new volcanic islets have risen from the surrounding water, the last in 1866. The island is treeless and poorly watered, but the volcanic soil is fertile. Wine and puzzuolana are exported. Population, in 1889, 11,924. The chief town is Thira, with a population of 1050. The island, under the name of Thera, was an important commercial State in ancient times and the mother country of the powerful colony of Cyrene in Africa. Remains of prehistoric dwellings have been found in Therasia and Southern Santorin, buried in part under an early eruption, of which the date cannot be determined with certainty. Mycenæan remains have also been found. The early inscriptions preserve a very primitive form of the Greek alphabet, containing only twenty of the twenty-two letters of the Semitic alphabet, and lacking the supplementary signs, though these were added under Ionian influence. (See ALPHABET.) Not only are the remains on the island important for the prehistoric civilization of the Ægean, but the excavation of the ancient city of Thera on the southeast coast, which was begun in 1898, has thrown much interesting light on the local history and life of a Greek island, especially during the Hellenistic and Roman periods. Consult: Hiller von Gaertringen and others, *Thera, Untersuchungen, Vermessungen und Ausgrabungen in den Jahren 1895-1898* (vol. i., Berlin, 1899; vol. iv., Berlin, 1902). The inscriptions are published in *Inscriptiones Græcæ Insularum Maris Ægæi*, fasc. iii. (Berlin, 1898).

SANTORINI, sän'tō-rē'nē, GIOVANNI DOMENICO (1681-1737). An Italian anatomist, born in Florence and educated there by the Jesuits. He studied medicine in Pisa, under Malpighi, and then practiced in Florence, where he was professor of anatomy. His medical writings, especially those on anatomy and obstetrics, were long in high repute. Among his anatomical discoveries are the emissary veins leading out of the sinuses of the skull, the tubercles or cartilaginous knobs of the larynx, the risory muscles, and the gaps or fissures in the external ear.

SANTOS, sän'tōs. A seaport of Brazil, in the State of São Paulo, situated on the Atlantic coast 200 miles southwest of Rio de Janeiro, and 25 miles south of São Paulo, the capital of the State, with which it is connected by a railroad (Map: Brazil, H 8). It is a handsome city, with well paved and shaded streets, and fine public gardens. There is also a good water supply, but the location is nevertheless one of the most unhealthful in South America, being subject to annual epidemics of yellow fever. Recent drainage works have, however, somewhat improved its sanitary condition. The harbor ranks next to that of Rio in importance and in the amount of its trade and shipping. It is provided with wharves accessible for large ships, and in 1900 699 vessels, with a total of 869,718 tons, entered, and about as many cleared. A large number of immigrants pass through this port. Santos is now the principal outlet for the great coffee-producing State of São Paulo, having in recent years supplanted Rio de Janeiro as the greatest coffee-exporting port in the world. The export in 1900

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amounted to 5,849,114 bags of 132 pounds each valued at about $44,000,000. Population, in 1900, estimated at 41,000.

SANTOS-DUMONT, sän'tōs dụ'mŏn', ALBERTO (1873—). A Brazilian aëronaut and designer of air-ships, born in São Paulo. From an early age he was interested in practical mechanics and engineering, and especially in the literature of aëronautics, but it was not until 1897 that he attempted his first ascent at Paris, where he made his residence. Soon after he constructed and used a spherical balloon in which new and original ideas were embodied, and in 1898, profiting by his experience as an automobilist, he successfully applied a gasoline engine and propeller to an elongated balloon. For an improved air-ship he received the Encouragement Prize of the Paris Aëro Club in 1901, and in the same year with his sixth air-ship he made a trip from Saint-Cloud around the Eiffel Tower and back, winning the Deutsh Prize and receiving a medal from the Brazilian Government. Subsequently he devoted himself to improving his air-ships and to devising new types, especially for military and long distance work. For description of these and other air-ships see AËRONAUTICS. Consult Santos-Dumont, *My Airships* (New York, 1904).

SANTO TOMÁS, tō-mäs'. A town of Central Luzon, Philippines, in the Province of Batangas, situated 25 miles north of Batangas, on the main road and projected railroad between that city and Manila (Map: Philippine Islands, F 5). Population, estimated, 1899, 10,769.

SAN VICENTE, sän vē-sän'tā. A town of the Republic of Salvador, on the right bank of the Acahuapa River, 32 miles east of San Salvador (Map: Central America, C 4). It manufactures *rebosos*, silk shawls, shoes, hats, salt, spirits, and cigars. Population, about 10,000.

SANZIO, RAPHAEL. See RAPHAEL SANTI.

SÃO CARLOS DE CAMPINAS, soun kär'-lōs dā kăm-pē'nās. See CAMPINAS.

SÃO FRANCISCO, frän-sēs'kō. The chief river of Eastern Brazil (Map: Brazil, K 5). It rises on the Serra da Canastra in the southern part of the State of Minas Geraes, and flows northeast through that State and the State of Bahia, then eastward on the boundary between Bahia and Pernambuco, and finally southeast between Alagoas and Sergipe, emptying into the Atlantic Ocean 200 miles southwest of Pernambuco. Its total length is about 1800 miles. The greater part of its course lies on the semi-arid plains of the Brazilian plateau. In its extreme upper course it is torrential, descending from the mountains in a series of rapids as far as the confluence with the Rio das Velhas, where it becomes navigable for large vessels. For the next 1000 miles of its course it is broad, deep, and navigable until it begins the descent of the escarpment, about 200 miles from the sea. Here it is completely obstructed by a series of rapids which end in the magnificent Falls of Paulo Affonso, where the river, narrowed to a width of 60 feet, plunges over a rocky ledge in three leaps with a total height of 265 feet. Below the falls, which have been called the 'Niagara of Brazil,' the river flows through a deep cañon, and only for the last 135 miles of its course is it navigable for sea-going vessels. It enters the ocean by two mouths, both of which are partly obstructed by bars, though they admit vessels of 15 feet draught at high water. A railroad has been built around the falls, and another connects Bahia with Joazeiro on the upper course of the river, which is regularly navigated by inland steamers. The tributaries are all comparatively short, though several are navigable. The largest is the Rio Grande, one of whose branches, the Rio Preto, has continuous water connection with a branch of the Tocantins.

SÃO JOÃO D'EL REI, soun zhō-oun'dĕl rā'ē. A town of the State of Minas Geraes, Brazil, sixty-six miles southwest of Ouro Preto, on the right bank of the river Mortes. It is an important commercial centre, with railroad connection with Sabará and Rio de Janeiro. The town was founded in 1670 and was formerly celebrated for its gold and diamond mines. Now its chief industry is stock-raising. It exports hides, lard, and cheese. Population, about 10,000.

SÃO LEOPOLDO, lā'ō-pōl'dō. A town of the State of Rio Grande do Sul, Brazil, on a branch of the Jacuhy, twenty miles north of the capital, Porto Alegre (Map: Chile, G 9). The town is in a rich agricultural region, peopled almost wholly by Germans, many of whom are descendants of the first German colony of Brazil, established here in 1824. Population, about 7000.

SÃO LUIZ DE MARANHÃO, lōō-ēsh' dā mä'rà-nyoun'. A city of Brazil. See MARANHÃO.

SAÔNE, sōn (ancient *Arar*). A river of France, the most important affluent of the Rhone (Map: France, L 5). It rises in the Faucilles Mountains in the Department of Vosges, and flows south past Gray, Chalon, and Mâcon to its confluence with the Rhone at Lyons. It is 300 miles long, and navigable to Corre, 232 miles. Canals connect it with the Loire, the Seine, the Meuse, the Moselle, and the Rhine. The chief affluents are the Doubs and Ognon. Consult Hamerton, *The Saône* (London, 1888).

SAÔNE, HAUTE. A department of France. See HAUTE-SAÔNE.

SAÔNE-ET-LOIRE, ā lwär. A southeastern department of France, bounded on the east by the Department of Jura and the river Saône, and on the west by the Department of Nièvre and the river Loire (Map: France, L 5). Area, 3,302 square miles; population, in 1896, 621,337; in 1901, 620,360. The country consists for the most part of fertile plains, watered by the rivers which give their names to the department, and separated by rich vine-clad hills. The most important cereals are wheat and oats. Coal is mined extensively, and there are important iron manufactures, the works of Le Creusot (q.v.) being in this department. Capital, Mâcon.

SÃO PAULO, soun poū'lō. A State of Brazil, situated in the southeastern part of the Republic and bounded by Minas Geraes on the north and east, Rio de Janeiro on the east, the Atlantic Ocean and the State of Paraná on the south, and Matto Grosso on the west (Map: Brazil, H 8). Area, 112,280 square miles. The narrow strip of low coastland is succeeded by a mountain chain running parallel to the coast. The country west of the mountains is an elevated plateau, traversed by numerous river valleys. The western portion, adjoining the Paraná River, is little known and inhabited only by roving Indians. The chief riv-

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ers of the State are the Pardo, Tietê, and the Aguapehy, all of them tributaries of the Paraná, and partly navigable. The climate is generally moderate and healthful and only the coast is excessively hot, while frost occurs on the plateau. The soil is of great fertility and is so well adapted for the cultivation of coffee that São Paulo has become the chief coffee-producing State of Brazil. Sugar-cane is also produced in the coast land, and stock-raising is carried on extensively in the interior. The chief manufactured products are cotton goods, cigars and tobacco, and some iron products. Commercially São Paulo occupies a very prominent position. The annual value of its exports amounts to nearly $150,000,000, of which coffee forms over 90 per cent. The commerce and manufactures are largely in German hands. The capital, São Paulo, is connected by rail with the chief seaport, Santos, as well as with Rio de Janeiro and the railway lines of Minas Geraes. Population of the State, in 1890, 1,384,753, including a large European element.

SÃO PAULO. The capital of the State of São Paulo, Brazil, and one of the largest cities in the Republic. It is situated 210 miles southwest of Rio de Janeiro, on a plateau having a mild and healthful climate, and separated from its port, Santos, 25 miles distant, by the Serra do Mar (Map: Brazil, H 8). It has a modern appearance, with long, busy streets, traversed by street railroads, lighted by electricity, and lined with fine shops and warehouses. The most notable buildings are the cathedral, the Government building, which is an old Jesuit college, dating almost from the foundation of the city, the episcopal palace, the treasury, and the magnificent Ypiranga Palace, erected to commemorate the Declaration of Independence. There are also a large and well-equipped hospital and a celebrated law school. São Paulo is the industrial centre of the State, the principal manufactures being articles of consumption. It also has a large trade, and is the centre of the State railroad system. Its growth during the last two decades has been exceedingly rapid, and is largely due to German and Italian immigration. Its population in 1890 was 64,934, and in 1900 it was estimated at 100,000. The city was founded by the Jesuits in 1554 as a mission station.

SÃO ROQUE, rō'kâ, CAPE. See CAPE SAN ROQUE.

SAOSHYANT, sou'shyânt (Av. *saošyant*, he who is to save, fut. part. of *sū*, Skt. *śū*, to swell, prosper). The Iranian Messiah. In the earlier parts of the Avesta the term is frequently used in the plural to denote those who by their special sanctity and zeal further the cause of Zoroastrianism, and also to refer to such saints as will appear at the millennium, where they will assist in the complete renovation of the world which will then take place. In its special and more usual sense, however, the Saoshyant is the last and greatest of the three millennial prophets, who is to usher in the day of judgment of all mankind. This religious concept is not certainly mentioned, although it may be implied, in the oldest portions of the Avesta (q.v.), the Gathas (q.v.); but in the later Avesta, especially in the nineteenth yasht, the idea is developed, while the Pahlavi texts (see PAHLAVI LANGUAGE AND LITERATURE) give the doctrine in full detail. According to Parsi mythology Zoroaster (q.v.) thrice approached his third wife, Hvovi, but without union. The seed was preserved in the Lake of Kansava, which is identified with the modern Hamun swamp in Seistan. At the end of nine out of the twelve thousand years which elapse between the creation and the day of judgment, a virgin bathes in Lake Kansava, conceives, and bears the first of the millennial prophets, Ukhshat-ereta or Aushetar. After another thousand years a second virgin in like manner bears Ukhshat-nemah or Aushetar-mah, and when this millennium expires, Astvat-ereta, the great Saoshyant, is born. During these three thousand years the world continually grows better, so that even in the time of Ukhshat-nemah but one-third of mankind is evil, while human food consists only of vegetables and milk, and is taken but once in three days. When Astvat-ereta comes the preparations for the resurrection of the dead begin, commencing with the first man, Gayomart, and the primal pair, Mashya and Mashyoi. This takes fifty-seven years, during which the Saoshyant is assisted by fifteen men and fifteen maidens. After the judgment Astvat-ereta, with his helpers, performs a sacrifice of the ox Hadhayos or Sarsaok and the white Hom plant (see SŌMA). From these offerings a mystic drink is prepared which gives immortality to all mankind. After this the Saoshyant, together with his helpers, gives, at the command of Ormazd (q.v.), recompense to all according to their deeds.

The origin of the Saoshyant concept is uncertain. One is naturally inclined to derive it from Babylonia, whence certain Iranian ideas were certainly borrowed. Of this, because of the meagre eschatological literature of Assyria and Babylonia (see ESCHATOLOGY), there is little evidence, for Marduk, who, like Ninib and Gula, is called the 'restorer of the dead to life,' and who triumphs over Tiamat in the cosmic battle which is transferred in Zoroastrianism as in Judaism from the beginning to the end of the world, is scarcely an analogue. The revivification given by Marduk is only some such boon as deliverance of the sick from disease. Neither do the religions of India afford any parallel to Astvat-ereta. So far as the material at present available goes, the idea is specifically Iranian. The analogy of the Zoroastrian with the Judæo-Christian Messiah idea is striking, especially in the teaching of the apocryphal books, as the apocalypses of Ezra, Paul, and John, and of the Gospel of Nicodemus (cf. also Revelation xi. 3) that Enoch and Elijah, or Moses and Elijah (cf. also Matthew xvii. 3), are to precede the Messiah. On the other hand, it may be possible that the religious influence of Persia on the Jews has been overestimated, and that the Saoshyant and the Messiah were independent developments. Consult: Jackson, "Iranische Religion," in Geiger and Kuhn, *Grundriss der iranischen Philologie*, vol. ii. (Strassburg, 1900-03); Casartelli, *Philosophy of the Mazdayasnian Religion Under the Sassanids* (Bombay, 1889); Söderblom, *La vie future d'après le Mazdéisme* (Paris, 1901); Böklen, *Verwandtschaft der jüdisch-christlichen mit der parsischen Eschatologie* (Göttingen, 1902).

SÃO THOMÉ, soun tô-mâ', or SAINT THOMAS. An island belonging to Portugal, and situated off the west coast of Africa in the Gulf of Guinea, 270 miles south of the mouth of the Niger (Map:

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Africa, E 5). Area, 358 square miles. It is volcanic and mountainous, being more than 7000 feet high. The rainfall is abundant, and nearly the whole island is covered with luxuriant forests. The chief product is cacao, of which 14,914 tons were exported in 1901. Coffee and cinchona are also exported. There is considerable trade, the exports in 1900 being valued at $3,808,035. The capital, Cidade de São Thomé, is the residence of a governor, whose jurisdiction extends also over the neighboring Prince's Island. Population, in 1900, 37,776, 90 per cent. of whom were negroes.

SAP (AS. *sæp*, OHG. *saf*, Ger. *Saft*, sap; probably from Lat. *sapa*, must). The popular name for the watery solutions found in plants, and without exact scientific significance. It is properly applied only to the juices, though sometimes used to designate the slimy protoplasm which escapes from the delicate layers of cells lying between the bark and the wood in shrubs or trees. It exists in the interior of the protoplasm of active cells and also dead and otherwise empty cells, such as wood. The water absorbed by the protoplasm is first secreted in the form of minute droplets; these enlarge and merge one by one, until at maturity usually only one large sap cavity (vacuole) occupies the centre of the protoplasm. (See GROWTH, Fig. 5.) This water takes up into solution many of the foods manufactured by the plant and also a great many of the mineral salts which enter the plant from without. It is, therefore, a solution of a variable but very large number of the most diverse materials. The solution is usually very dilute, although in cells of storage tissues a considerable percentage of reserve food may be present. Thus in the cultivated beet the percentage of cane sugar in the sap runs from 10 to 17, while various gums, proteids, and salts are also present in smaller amounts. Expressed sap is utilized for flavoring palatable drinks, for sugar-making, for making various liquors, as pulque, etc. The sap of trees is popularly, but erroneously, supposed to ascend in the spring and descend in the autumn. The amount of sap in such plants increases from summer until early spring. Through the winter the tissues are saturated, and in cold climates they freeze solid. See CONDUCTION.

SAP (OF. *sappe*, Fr. *sap*, hoe, mattock, from ML. *sappa*, *sapa*, hoe, mattock, probably from Gk. σκαπάνη, *skapanē*, hoe, from σκάπτειν, *skaptein*, to dig). A military term denoting a narrow trench, subsequently widened, which is continually prolonged in the desired direction, by digging away the earth at its head, and utilizing the same as a cover for the working party. A *single* or *full sap* is a trench with the parapet constructed at the head, and on its exposed flank. A *double sap* is so called when both flanks and the head of the sap are exposed to fire; two full saps are driven parallel and very near to each other, each with its parapet on the outer flank. The double sap is formed by removing the strip of earth dividing the two narrow trenches, the result being a single wide trench or sap with a parapet on each side. Running a sap has always been a difficult as well as dangerous operation, owing to the command of fire possessed by the enemy, and soon came to be restricted to night operations. The modern searchlight and other electrical contrivances, however, make the hazard as great by night as it would be by day. The soldiers formerly detailed and trained for this work in the British Army were known as sappers. See SIEGE AND SIEGE WORKS.

SAPAJOU, or **SAJOU.** A French rendering of an obscure native name in Brazil (see SAI), now applied to the typical American monkeys of the genus Cebus, of which many species are known. The group includes some of the largest of American monkeys as well as those which have the largest brain capacity and show the greatest intelligence. The monkeys which range the farthest north are also sapajous. One of the most noteworthy species is the 'white-fronted' (*Cebus albifrons*), common in the forests at the headwaters of the Amazon and easily recognized by its light brown color and white forehead. Like the tribe generally, they live in troops of 30 or more and are great jumpers, leaping, it is said, 40 or 50 feet from tree to tree, when necessary. They are often made pets of, but are extremely jealous and are restless and irritable. One of the largest species is *Cebus olivaceus*, which is 44 inches long, 20 of which belongs to the tail. The 'sapajous' of the genus Ateles include the well-known coaitas or spider-monkeys (q.v.). Perhaps the best known of all is the weeper sapajou, or 'capuchin' (*Cebus capucinus*), whose fur has a golden tinge, and is short and even all over its head as though 'roached.' Young ones are constantly made captive. See Plate of AMERICAN MONKEYS.

SAPAN WOOD, SAPPAN WOOD (Malay *sapang*), or BUKKUM WOOD. The wood of *Cæsalpina Sappan*, an East Indian tree, about 40 feet high, with twice pinnate leaves, and racemes of yellow flowers, much used as a red dye, which is not easily fixed. It is largely exported from Singapore and other East Indian ports to Calcutta and to Europe.

SAP-CHAFER. One of many species of cetonian beetles which have mouth-parts formed for the sipping or lapping of vegetable juices rather than for boring or chewing. They feed indifferently upon the sap which exudes from wounds in trees or upon the juices of over-ripe or injured fruit or other succulent vegetable growth and upon pollen. One of the commonest species in the United States is the brown sap-chafer (*Euphoria inda*), a rather large brown variegated beetle which appears abundantly in the autumn over a large part of the Western States. The eggs are laid in the spring beneath the surface of the ground, and the larvæ, which are white grubs closely resembling the larvæ of the May-beetles and the figeater or June-beetle (qq.v.), feed upon decaying vegetable matter and soil humus.

BROWN SAP-CHAFER.

SAPHIR, sä'fêr, MORITZ GOTTLIEB (1795-1858). An Austrian humorous writer, born at Lovas-Berény, Hungary. He edited the Vienna *Humorist* from 1837 to 1858, and his humorous

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readings in that city enjoyed much popularity in their time. His publications, such as the *Fliegendes Album für Ernst, Scherz, Humor und lebensfrohe Laune* (1846), and *Konversationslexikon für Geist, Witz und Humor* (2d ed. 1860), are now little read. They display chiefly a faculty for clever plays upon words.

SAPHIRE D'EAU, sȧ'fêr' dō (Fr., water-sapphire), or DICHROITE. A gem variety of iolite. When cut it shows a very fine play of colors, presenting different shades of blue, bluish white, and yellowish gray, according to the directions in which the mineral is viewed.

SAP'INDA'CEÆ (Neo-Lat. nom. pl., from *Sapindus*, from Lat. *sapo*, soap), THE SOAPBERRY FAMILY. A natural order of dicotyledonous trees, twining tendril-bearing shrubs, and a few herbaceous climbers, about 1000 known species, natives of warm climates, especially of South America and India, about 300 species of lianas occurring in the tropics. None are natives of Europe, and Sapindus and Serjania are the only indigenous genera in the United States. The timber of some species is valuable; Guarana bread is made from the seeds of a species of this order; the leaves of another (Cardiospermum Halicacabum) are used as a boiled vegetable in the Moluccas; and the fruits of some species, as Nephelium and Litchi, are excellent. The chief genera of the order Sapindaceæ are Serjania, Paullinia, Sapindus, Litchi, Nephelium, Cupania, Blighia, Dodonæa, and Koelreuteria.

SAPI-UTAN. The Malay name of the anoa (q.v.). For illustration, see Plate of BUFFALOES.

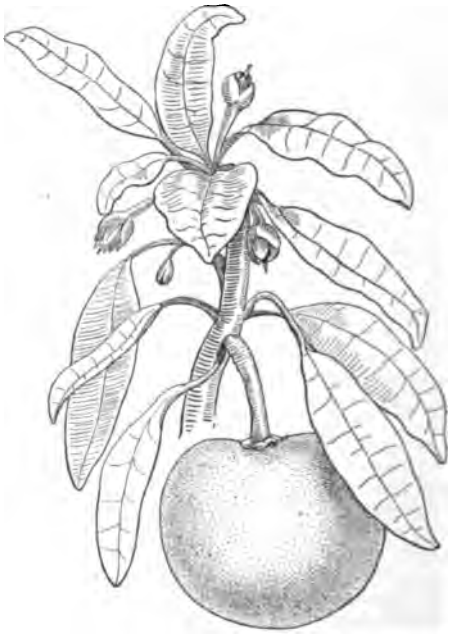
SAPO (Sp., large toad). A South American name for various toad-fishes (q.v.) especially one of the genus Porichthys, or 'midshipmen,' a species (*Porichthys notatus*) very abundant along the California coast. It lives under stones near the shore, and is locally known as the 'singing-fish,' on account of a peculiar humming noise made with its air-bladder. It is about 15 inches long, olive brown with coppery reflections, the sides marked with broad bars, and the pores of the lateral line bead-like and shining.

SAP'ODIL'LA (Sp. *sapotilla*, diminutive of *sapota, zapote*, from Aztec *zapotl*, sapota tree). A tree of the natural order Sapotaceæ (q.v.). The fruit has a sub-acid pulp which is highly esteemed for dessert in the West Indies, where the tree is native and whence it has been introduced into many other tropical countries.

SAPONI, sȧ-pō'nê. A Virginia tribe of Siouan stock (q. v.) known in history as the confederates of the kindred Tutelo, both tribes being now extinct. The Saponi are first mentioned in 1670 by the German traveler John Lederer (q.v.), who visited their town on what appears to have been Otter Creek, southwest of Lynchburg. Besides Lederer's early notes we have some valuable ethnologic information concerning the Saponi from William Byrd (q.v.), in charge of the Virginia boundary survey of 1728, who visited their town and had one of their men in his service as guide and hunter. They still made fire by rubbing two dry sticks together, and new fire was always made for each ceremonial occasion. They made spoons from buffalo horn, and their women wove baskets and dress fabrics from the fibre of 'silk grass' (yucca). They had horses, but were awkward riders. They had strict regard to religious taboos. The men were described as having something great and venerable in their countenances, beyond what was common among savages. See also OCCANEECHI; TUTELO.

SAPON'IFICA'TION. See ESTERS; FATS; OILS; SOAP.

SAP'ONIN (from Lat. *sapo*, soap), $C_{32}H_{54}O_{18}$. A glucoside contained in various plants, including the *Saponaria officinalis*, or soapwort, the *Polygala senega*, the fruit of the horse-chestnut, etc. It is readily extracted from the root of soapwort by means of boiling alcohol, which, as it cools, deposits the saponin as an amorphous sediment. It derives it name from its behavior with water, with which it forms an opalescent fluid that froths when shaken, like a solution of soap, if even $\frac{1}{1000}$ part of saponin be present. By the action of dilute acids saponin breaks up into sapogenin, $C_{14}H_{22}O_2$, and sugar.



SAPODILLA (*Achras Sapota*).

SAPORTA, sȧ'pōr'tȧ', GASTON, Marquis de (1823-95). A French botanist and paleontologist, born at Saint Zacharie (Var). He served in the army, then devoted himself to vegetable paleontology, and in 1876 became a corresponding member of the French Academy of Sciences. Besides many contributions to periodicals, of which part were on the climate of geological periods, he wrote: *Le monde des plantes avant l'apparition de l'homme* (1878); *L'évolution du règne végétal* (with Marion, 1881-85); *Origine paléontologique des arbres cultivés* (1888); and a genealogical study, *La famille de Mme. de Sévigné en Provence* (1889).

SAP'OTA'CEÆ (Neo-Lat. nom. pl., from *Sapota*, from Sp. *sapota*, zapote, sapota tree), THE SAPODILLA FAMILY. A natural order of dicotyledonous trees and shrubs, often abounding in milky juice, which in many species yields gutta-percha. There are nearly 400 known species, chiefly natives of the tropics, and the

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remainder of subtropical countries. The fruits of some are pleasant, as the sapodilla and other species of the genus Achras, the star apple (q.v.) and other species of Chrysophyllum, various species of Mimusops, Lucuma, etc. The genus Bassia contains species valuable for the oils which they yield. The seeds of Mimusops Elengi also yield oil abundantly. The following genera embrace species which yield gutta-percha, some of them at one time being almost the only sources of that product: Payena, Palaquium, Bassia, Isonandra or Dichopsis, and Mimusops.

SAPPHIRE (OF., Fr. *saphir*, from Lat. *sapphirus*, from Gk. *σάπφειρος*, *sappheiros*, sapphire, or perhaps lapis lazuli, from Heb. *sappir*, sapphire). A blue variety of corundum (q.v.), highly prized as a gem. It is similar in composition to the ruby, but it is somewhat harder and of slightly higher specific gravity. It crystallizes in the hexagonal system, usually in the form of double pyramids. The sapphire has a beautiful blue color, although spotted varieties are not rare, the yellow, white, and blue spots being sometimes sharply separated or again grading into each other. Heating the stone drives the blue color away permanently. The value of the gem increases with the depth of the color up to the limit of translucency, the most prized specimens having a corn-flower blue tint. Asteria is the name applied to an imperfectly transparent variety which, when cut in the form of a dome, shows six star-like rays. Sapphires of good color and size are more common than rubies and much cheaper. A specimen of good color, weighing two or three carats, has about the same value as a diamond of equal size. Some very large sapphires have been found; one of 951 carats was recorded in 1827 as being in the possession of the King of Ava. Other large stones are in the museum of the Jardin des Plantes, Paris. Sapphires occur in very much the same regions as the ruby, and indeed the two are often found together. The best sapphires come from Siam, where they are mined in the loose surface deposits which yield the ruby. They are also found in Burma, Ceylon, and Kashmir, and at many localities in Australia. The Australian sapphires are not regarded with much favor, owing to their dark color. In the United States the most valuable stones are obtained in North Carolina and Montana. In the former State they are found in gravel deposits, from which they are separated by a washing process. The Montana deposits, the most important discovered in recent years, occur as bars on the upper Missouri River, and also in an igneous dike, which can be traced for several miles. The stones are obtained chiefly from the decomposed portion of the dike and are separated from the matrix by washing. They range in weight from less than one carat up to four or five carats. The production of sapphires in the United States in 1901 was valued at $90,000, almost the entire output coming from Montana.

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SAPPHO (Lat., from Gk. Σαπφώ). A Lesbian poetess of good family, a contemporary of Alcæus (c.600 B.C.) and with him the chief creator of the Æolian personal lyric. Sappho is for us chiefly a name—a theme for the fervent rhetoric evoked by impassioned contemplation of the few exquisite fragments of her poems that time has spared, a type of the highest achievement of woman in literature, a symbol and synonym of the intoxication of absolute lyric, 'all fire and dew.' She was born possibly at Eresos, more probably at Mitylene, where she lived until she was exiled by an uprising of the democratic party against the oligarchs. From her poems we infer that she practiced and taught her art in a coterie, club, or school of maidens, to whom she was devotedly attached, whom she addressed in the language of passionate adoration, and whose bridal odes she composed when they left her to marry. Familiar to all poets and lovers is the legend of her unrequited love for Phaon and of her casting herself down from the promontory of Lover's Leap to that "Leucadian grave which hides too deep the supreme head of song" (Swinburne). Alcæus is said to have been her lover and to have addressed her in the words, "Violet-tressed, sweetly smiling, pure Sappho, fain would I speak, but shame forbids." To this she replied, "If thy desire was of aught fair and good, shame had not beset thine eyes, but thou hadst spoken thereof frank and true."

The ancients read her poems in nine books. The extant fragments include (1) the ode to Aphrodite, twenty-seven lines in Sapphic strophes quoted by the critic Dionysius of Halicarnassus as an example of the 'smooth style;' (2) the "Blest as the immortal gods is he," to name it by Ambrose Philips's hopelessly inadequate translation, four Sapphic strophes cited by Longinus as a specimen of the sublime; and (3) some hundred or more single lines and stanzas in a great variety of lyric metres. They may be found in Bergk's *Poetæ Lyrici*, in the Teubner *Anthologia Lyrica*, and, with English translations added, in Wharton's *Sappho*. Some additional fragments have recently been recovered from Egyptian papyri. The chief motives of Sappho's poems are love and the beauty of nature. They contain no profound thoughts and few striking images, and the exquisite beauty of their diction and the liquid lapse of the rhythm can no more be rendered into English than Keats's odes could be translated into French or German. Swinburne, in "On the Cliffs," thus strives to reproduce the impression of one wistful waif of verse:

> "*I loved thee*,—hark, one tenderer note than all—
> *Atthis, of old time, once*—one low, long fall,
> Sighing—one long, low, lovely, loveless call,
> Dying—one pause in song so flamelike fast—
> *Atthis, long since in old time overpast*—
> One soft first pause and last.
> One,—then the old rage of rapture's fiercest rain
> Storms all the music-maddened night again."

SAPPHO'S LEAP. The high cliff anciently called Leucadia or Leucas, now Cape Ducato, on Santa Maura, one of the Ionian Islands. From it Sappho the poetess is said to have thrown herself into the sea on account of her hopeless love for Phaon.

SAPPORO, sä'p'pô-rô. The capital of the island of Yezo, Japan, situated on the Ishigari River, a short distance from the western coast (Map: Japan, G 2). It has an agricultural college, a museum with specimens of the work of

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aborigines, and a botanical garden. The manufacturing establishments include saw, flour, and sugar mills and a flax factory. Sapporo owes its importance to its connection with the colonization of Yezo, since 1870. Population, in 1898, 37,482.

SAP'ROPHYTE (from Gk. σαπρός, *sapros*, rotten + φυτόν, *phyton*, plant). A plant which contains no chlorophyll and which derives its nourishment from dead organic matter. Saprophytes are among the active agents which rid the earth of the remains of animals and plants, which would otherwise accumulate. Among flowering plants there are some symbiotic saprophytes such as Indian pipe (Monotropa), and certain orchids (as Corallorhiza). These grow in rich humus, the underground portions generally associated with a fungous mycelium. (See MYCORHIZA.) Among the ferns and their allies the saprophytic habit has also been developed to some extent; but saprophytism is best illustrated among the fungi, where entire groups exhibit this mode of life. See SYMBIOSIS.

SAPSUCKER. Any of various American woodpeckers alleged to suck the sap of trees; properly the yellow-bellied woodpecker (*Sphyrapicus varius*), which breeds in Canada and migrates through the United States in spring and autumn. It is of medium size, black above, with white markings and a white rump; forehead, crown, chin, and throat crimson in the male, less so in the female; breast with a broad black patch; belly pale sulphur-yellow. These colors are highly variable. It has the habit of pecking squarish holes in great number in the spring, in the bark of sweet-sapped trees, eating to some extent the new wood beneath, and the sap, and catching the insects attracted by the sweet exudation. Its breeding habits are similar to those of woodpeckers generally. Several other species of the genus are known in the West, that common on the Pacific coast (*Spyrapicus ruber*) having the whole head, neck, and chest of the adults of both sexes red. See WOODPECKER; and consult authorities there cited.

SAPTARSHI, sâp-tär'shê (Skt., the seven sages, seven bright stars of Ursa Major). A system of reckoning time in India, especially in Kashmir, although formerly current also in Multan and elsewhere. It is based on the theory that the seven Rishis (the seven bright stars of Ursa Major) move through the zodiac in 2700 years, at the rate of one nakshatra, or twenty-seventh of the ecliptic, each century. In ordinary reckoning the hundreds are omitted. In calculation 47 must be added to the Saptarshi year to find the corresponding Saka (q.v.) year, and 24-25 to determine the Christian equivalent. Consult Sewell and Dikshit, *The Indian Calendar* (London, 1896).

SAPUCAIA NUT (Brazilian name). The seed of Lecythis Ollaria, a lofty Brazilian tree, of the natural order Lecythidaceæ. The urn-shaped fruit as large as a child's head, which opens by a deciduous lid, contains several oval, somewhat pointed, slightly bent seeds or nuts, as in the case of the allied Brazil nut (q.v.), which is inferior in flavor but is far more extensively exported.

SAQQARA, sâk-kä'rä, or **SAKKARA.** An Egyptian village on the left bank of the Nile, in latitude 29° 52′ N., situated on the edge of the Libyan desert, about three miles from the river. It stands in the midst of the ancient necropolis of Memphis (q.v.), and around it are some of the most interesting monuments in Egypt. Saqqara means, in Arabic, 'hawk's nest,' but the word is probably a corruption of the old Egyptian name containing the name of Sokar, the Memphitic god of the dead. In the immediate vicinity of the village, and to the west of it, are the pyramids of Pepi I. and his son Mer-en-Rê, of the Sixth Dynasty; that of Pepi II., another son of Pepi I., lies a little farther south. To the north are the pyramids of Teti, the founder of the Sixth Dynasty, and of Unas, the last King of the Fifth Dynasty. All these pyramids were opened in 1881, and the walls of their sepulchral chambers were found to be covered with long inscriptions of a religious character. Between the pyramids of Unas and Teti lies the great step-pyramid of Saqqara, which has been attributed to King Zoser, and, if this be true, it is undoubtedly the oldest pyramid in existence. It consists of six stages, is about 190 feet in height, and contains numerous corridors and chambers. Near it are the subterranean tombs of the Apis bulls and the remains of the Serapeum (q.v.). In this vicinity are the tombs of a number of nobles of the Fifth and Sixth Dynasties. They are of great architectural interest and their inner walls are covered with reliefs and paintings giving vivid illustrations of Egyptian life and customs under the Old Empire. Consult: Lepsius, *Denkmäler* (Berlin, 1849-58); Wilkinson, *Manners and Customs of the Ancient Egyptians* (London, 1878).

SARA, sä'rä. A town of Panay, Philippine Islands, in the Province of Iloilo, situated 3 miles northwest of Concepción (Map: Philippine Islands, H 8). Population, estimated, in 1899, 10,950.

SARABANDE (Fr. *sarabande*, from Sp. *zarabanda*, probably from Pers. *sarband*, fillet, from *sar*, head + *band*, bond). Originally, a slow dance said to be of Saracenic origin; and hence a short piece of music, of deliberate character, and with a peculiar rhythm, in three-quarter time, the accent being placed on the second crotchet of each measure. The sarabande forms an essential part of the suites written by Handel, Sebastian Bach, and others of the old masters, for the harpischord or clavichord. All extra movements were inserted after the sarabande. The dance became popular in Europe in the sixteenth century, but it was bitterly attacked by Cervantes and other Spanish writers for its indecency, and Philip II. suppressed it for a time. A modified form of it, however, was introduced in France, and in England it became a popular country dance.

SARACENS (OF. *sarracen*, *sarracin*, *sarrazen*, Fr. *sarrasin*, from Lat. *Saraceni*, from Gk. Σαρακηνός, *Sarakēnos*, Saracen, from Ar. *šarqīn*, pl. of *šarqiy*, from *šarq*, rising sun, from *šaraqa*, to rise). A name variously employed by mediæval writers to designate the Mohammedans of Syria and Palestine, the Arabs generally, or the Arab-Berber races of Northern Africa, who conquered Spain and Sicily and invaded France. At a later date it was employed as a synonym for infidel nations against whom crusades were preached, and was thus applied to the Seljuks of Iconium, the Turks, and others. The name appeared as early as the first century of the

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Christian Era, when it was applied by Greek writers to some Arab tribes of the Syrian Desert, of Northwestern Arabia, and of the Desert of Tih. In the hundred years following the Hejira (A.D. 622) a Saracen empire was established which extended from Turkestan to the shores of the Atlantic. Mohammed made himself master of Mecca in 629, and the first caliphs, Abu-Bekr and Omar, between 632 and 641, conquered Syria, Palestine, Persia, and Egypt. By 709 the Saracens had extended their sway over Northern Africa to beyond the Strait of Gibraltar. They then crossed over to Spain (711), nearly the whole of which they subjugated. From Spain they poured into Gaul, where their progress was arrested by Charles Martel, near Poitiers, in 732. Sicily was conquered by them between 827 and 878, and early in the tenth century they extended their incursions far into the Burgundian territories. The disruption of the great Saracen realm began about the middle of the eighth century, when the western portion tore itself away from the rest, becoming a separate State, with Cordova as its capital. For a general sketch of the history of the Saracens, consult: Freeman, *The Saracens* (London, 1876); Ockley, *The Saracens* (London, 1847). See ARABIA; CALIPH; OMMIADS; ABBASSIDES; CRUSADE.

SARAGOSSA, sä'rä-gôs'sä (Sp. *Zaragoza*). The capital of the Province of Saragossa, Spain, and formerly of the Kingdom of Aragon, situated on the right bank of the Ebro, 115 miles in a straight line from its mouth, and 165 miles northeast of Madrid (Map: Spain, E 2). It stands in the midst of a desert plain, but is immediately surrounded by a well-irrigated and fertile *huerta*. Two bridges cross the Ebro to the northern suburb, one a handsome stone bridge of seven arches, the other a railroad bridge. The central nucleus of the town still retains its old aspect, with narrow, winding lanes, lined with old houses of solid construction and often richly decorated, many of them being the former palaces of nobles, but now generally in a dilapidated condition. The surrounding portions of the town are modern and regularly built, with broad streets and shaded boulevards. The most prominent buildings of the city are its two cathedrals, the old Gothic Cathedral of La Seo, built between 1119 and 1520, and that of Nuestra Señora del Pilar, begun in 1681. The latter contains the sacred pillar on which the Holy Virgin is believed to have appeared to Saint James. Other notable buildings are the Church of San Pablo, in the Transition style of the thirteenth century; the Gothic Church of Engracia, partly destroyed during the siege of 1808; the Castillo de la Aljafería, built by the Moors and later used as the royal residence of Aragon; the Audiencia, formerly the palace of the counts Luna; and the Lonja, or Exchange, a handsome and richly decorated Renaissance building. Saragossa has a university founded in 1474, with 800 students, a veterinary school, a superior normal school, schools of music and fine arts, as well as of commerce and trade, and a botanical garden. The city is an important railroad centre, and its commerce and manufactures are thriving. It has iron foundries, machine shops, flour and paper mills, breweries, and manufactures of chocolate, preserves, glass, chemicals, soap, and candles. Population, in 1887, 92,407; in 1900, 98,125.

Saragossa is on the site of the ancient Iberian *Salduba*. Its strategic importance was recognized by the Romans, who made it a military colony under the name of *Cæsarea Augusta*, from which its Spanish name is a corruption. It was in the possession of the Moors from 712 to 1118, when it was taken by Alfonso I. after a long siege. Saragossa is especially famous for the heroism with which the citizens, led by Palafox (q.v.), defended it against a large French army in 1808-09. The French finally captured the city after a hard-fought contest in which they suffered great losses.

SARAGOSSA, MAID OF. See AGUSTINA.

SARAJEVO, sä'rä-yä-vô. See SERAJEVO.

SAR'ANAC LAKE. A village in Franklin County, N. Y., 130 miles northeast of Utica, in one of the most picturesque portions of the Adirondack Mountains; near the head of the Lower Saranac Lake, and on the New York Central and the Delaware and Hudson railroads (Map: New York, F 1). It is a noted pleasure and health resort and the business centre of the Adirondack region. Near by are the Adirondack Cottage Sanatorium for Consumptives and the State Hospital for Incipient Tuberculosis. Population, in 1890, 768; in 1900, 2594.

SARANSK, sä-ränsk'. The capital of a district in the Government of Penza, Russia, on the Saranka, 87 miles north of the city of Penza (Map: Russia, G 4). It is of some commercial importance on account of its fair. Population, in 1897, 13,743.

SARAPUL, sä'rä-pōōl'. A town in the Government of Vyatka, Russia, situated on the Kama, about 225 miles southeast of Vyatka (Map: Russia, H 3). It has extensive tanneries and boot factories and a considerable trade in grain. Population, in 1897, 21,395.

SARA SAMPSON, MISS. A play by Lessing produced in 1755. Its sentimentality made it very popular in its day, but it is interesting now only as the first introduction of middle-class life in German tragedy.

SARASATE, sä'rä-sä'tä, PABLO DE (1844—). A Spanish violinist, born in Pamplona. He studied the violin at the Paris Conservatory under Alard, and harmony under Reber, winning prizes in 1857 and 1859. In 1889 he visited America with Eugène d'Albert, and played in New York and other cities, with great success. His playing is characterized by a wonderful technique and a delicate and refined tone. Max Bruch wrote for him his Scotch fantasy and second concerto, and Lalo his concertos and *symphonie espagnole*. Sarasate's compositions are for his own instrument, and are light and Spanish in character.

SARASIN, sä'rä'zăn', PAUL (1856—). A Swiss naturalist and traveler, born in Basel, and educated there and in Würzburg. Together with his cousin, Fritz Sarasin, he explored Ceylon (1883-86) and they published on their return *Ergebnisse naturwissenschaftlicher Forschungen auf Ceylon* (1887-93), containing valuable zoölogical and ethnological data. After a second trip to Ceylon in 1890, they turned their attention to the island of Celebes, which they explored in 1893-96, and which they described in *Materialien zur Naturgeschichte der Insel Celebes* (1898).

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SARASVATI, sä-räsh'vä-tē. A Hindu goddess. See VAC.

SAR'ATO'GA, BATTLES OF. Two important battles of the American Revolution, fought on September 19 and October 7, 1777. Early in May, 1777, Burgoyne, with an English army of about 10,000, started from Canada toward Albany. His army was weakened by Baum's defeat at Bennington (q.v.), and by the frequent guerrilla attacks of the American militia. Crossing the Hudson on September 13th, he approached Bemis Heights, where the American army, under General Gates (q.v.), had taken up a strong position. On the 19th he advanced with 4000 men to attack the American left, but was met by General Benedict Arnold with a force of 3000 at Freeman's Farm. Here a battle raged for two hours, until darkness intervened, neither side gaining a decisive advantage and each side losing from 600 to 1000 of its number. This has been variously called the battle of Freeman's Farm, the first battle of Bemis Heights, the first battle of Stillwater, and the first battle of Saratoga. Burgoyne, finding that his supplies were cut off, and despairing of any immediate aid from New York, resolved, as a last resort, to hazard another attack. Accordingly on October 7th he advanced, with 1500 picked men, to turn the American left. Immediately his right was attacked by General Poore and his left by General Morgan; while Arnold, though then without technical authority, dashed to the front and took general command of the American forces. For some time the result remained in doubt, but the English gradually gave way after the gallant commander of their right, General Frazer, had been mortally wounded; and by a final attack, in which Arnold was severely wounded, they finally were forced behind their intrenchments. This engagement has also been called by some the battle of Bemis Heights, or of Stillwater. During the night the English retreated and took up a strong position about 12 miles from Saratoga (q.v.), on the site of the present Schuylerville. Meanwhile American recruits were swarming in from all sides, and soon Burgoyne was entirely surrounded, his supplies cut off, and his forces strictly confined, by a continual bombardment, within narrow lines. Not daring to risk another battle and fearing an immediate attack from vastly superior numbers, he opened negotiations with Gates, who at first demanded an unconditional surrender, but subsequently, on the 16th, agreed to what was called the 'Convention of Saratoga.' The English were to march out with the honors of war, and were to be allowed to embark at Boston for England on condition that they would not serve again in America during the war. Accordingly on the 17th Burgoyne formally surrendered his army of between 5000 and 6000 men to Gates. Congress subsequently refused to ratify the 'convention,' and the British troops, excepting a few officers, were detained as prisoners first in the vicinity of Boston and later at Charlottesville, Va., and elsewhere, until the close of the war. The victory aroused the greatest enthusiasm throughout the country, and was the determining event that led France to form an alliance with the United States. Consult: Carrington, *The Battles of the American Revolution* (New York, 1876); Stone, *The Campaign of Lieut.-Gen. Burgoyne* (Albany, 1877); Walworth, *Battles of Saratoga* (Albany, 1891); and Baron Riedesel's *Memoirs and Letters and Journals* (trans. by Stone, Albany, 1868).

SARATOGA SPRINGS. A village in Saratoga County, N. Y., 39 miles north of Albany, on the Delaware and Hudson, the Adirondack, and the Fitchburg railroads (Map: New York, G 2). It is one of the leading summer resorts in the United States, with mineral springs having a wide reputation for their medicinal properties. Races are held here during August, and the floral fête in September also contributes largely to the popularity of the resort. Saratoga Lake, 4 miles distant, is much frequented for sailing and fishing. Saratoga Springs is noted for its large, well-equipped hotels. In the Convention Hall, which has a seating capacity of 6000, a number of political and other conventions have been held. The village has an Athenæum, the library of the Fourth Judicial District, and a public library; an art gallery, Saint Faith School, Saint Christina Home for Orphans, and a hospital. One of the State armories is located in Saratoga Springs. The most important industries are the bottling of mineral waters, the preparation of carbonic acid gas for market, and the manufacture of druggists' and doctors' supplies and foundry products. The government, under the revised charter of 1895, is vested in a president and board of trustees who hold office for two years. Population, in 1890, 11,975; in 1900, 12,409.

The Indians early gave to this locality the name Sarachtague. In 1693 Major Peter Schuyler defeated a large force of French and Indians about three miles from the present village. In 1767 Sir William Johnson, when very ill, was brought to the site of the present Ballston Spa by his Indian friends, and quickly recovered. About 1773 a log cabin was built near here, and in 1777 General Philip Schuyler erected the first frame house in the vicinity. The village really dates from about 1792, and was incorporated in 1826. (See SARATOGA, BATTLES OF.) Consult: Stone, *Reminiscences of Saratoga* (New York, 1875); Brandow, *The Story of Saratoga and History of Schuylerville* (Albany, 1900); and a sketch in Powell's *Historic Towns of the Middle States* (New York, 1899).

SARATOV, sä'rä-tôf'. A government of Russia, bounded by the governments of Simbirsk and Penza on the north, the Volga on the east, Astrakhan on the south, the Province of the Don Cossacks on the southwest, and Tambov on the west (Map: Russia, F 4). Area, 32,624 square miles. The surface is elevated and well wooded in the north, while the central and southern parts have the character of a steppe. The region along the Volga is hilly. Besides the Volga the principal rivers of the government are the Medvieditza, the Khoper, and the Ilovlya—all tributaries of the Don. Saratov belongs to the black soil belt. Agriculture is carried on extensively, and large quantities of grain are exported by the Volga. The principal cereals are rye, wheat, and oats. Tobacco is cultivated on a large scale and gardening for export forms an important occupation in the region along the Volga. The annual value of the manufactures, principally flour, is over $12,000,000. The export trade in grain is heavy. Population, in 1897, 2,419,884, mostly Great Russians.

SARATOV. The capital of the government of the same name in Russia, situated on the right

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bank of the Volga, about 200 miles southwest of Samara (Map: Russia, G 4). It is well laid out, but, like most Russian provincial towns, is built chiefly of wood. It has a theological seminary and a museum with a school of drawing and a library attached to it. Flour mills, oil presses, and distilleries are the principal industrial establishments of the city. The export trade in grain is considerable. Population, in 1897, 137,-109, including many descendants of French and German settlers. The town was founded in the sixteenth century.

SARAVIA, sä-rä'vyä. A town of Western Negros, Philippine Islands, situated on the northwest coast, 15 miles north of Bacólod (Map: Philippine Islands, G. 9). Population, estimated, in 1899, 15,304.

SARAWAK, sä'rä-wäk'. A British protectorate on the northwestern coast of Borneo (q.v.).

SARAWAKESE. The natives of Sarawak, in Northwestern Borneo, comprising the Punans (various wild but gentle tribes of savages scattered over the interior—nomadic hunters representing the lowest type of culture); Kalamantan (more or less agricultural communities belonging to scattered and usually weak tribes along the coast and certain rivers); Kenyah-Kayan (immigrants several centuries ago from Dutch Borneo—well-organized and powerful tribes who have exterminated or enslaved some of the smaller aboriginal groups); Iban, or Sea Dayaks (originally on Batang Lupan and Saribas rivers, their spread being comparatively recent); and Malays (now rather mixed by contact with indigenous coast populations) on the coast and for a short distance up some of the rivers. Consult: Brooke, *Ten Years in Sarawak* (London, 1866); Denison, *Tour Among the Land Dyaks of Upper Borneo* (Singapore, 1879); Roth, *The Natives of Sarawak and British North Borneo* (London, 1896).

SARCEY, sär'sä', Francisque (1828-99). A French dramatic critic, born at Dourdan. He taught in the provinces (1851-58), on coming to Paris wrote first for the *Figaro*, and in 1859 became dramatic critic of *L'Opinion Nationale* (1859-67), and then of *Le Temps*, with which he was connected till his death, contributing also to About's *Dix-neuvième Siècle* and other journals. Public-spirited, but never partisan, he voiced with lively wit and shrewd common sense the average opinion in drama and in social reform. Sarcey is often charged with excessive admiration of mere stagecraft. His dramatic articles were not collected during his life, save for two series of *Comédiens et comédiennes* (1878-84) and *Le théâtre* (1893). A fuller selection by Larroumet is announced. Sarcey wrote also *Souvenirs de jeunesse* (1885) and *Souvenirs d'âge mûr* (1892), translated by Carey, *Recollections of Middle Life* (1893); an *Histoire du siège de Paris* (1871); and several novels.

SARCINA (Lat., bundle), or Sarcinula. A genus of minute plants of very low organization, sometimes reckoned among algæ, and sometimes among fungi. A number of forms or species are known. Although the most common seat of sarcinæ is the human stomach, they have likewise been detected in the stomach of the tortoise, the rabbit, the dog, the ape, and in the cæcum of the fowl; in the urine, in the lungs, in the fæces and intestinal canal, in the fluid of the ventricles of the brain, in cholera stools, in the fluid of hydrocele, and in the bones.

Sarcinæ are present in vomited fluids in certain forms of dyspepsia.

SARCOLACTIC ACID. See Lactic Acid.

SARCOLEMMA (Neo-Lat., from Gk. σάρξ, *sarx*, flesh + λέμμα, *lemma*, husk). A term applied to the delicate sheath which invests each primary muscular fibre. See Muscle.

SARCOMA. See Tumor.

SARCOPHAGUS (Lat. *sarcophagus*, from Gk. σαρκοφάγος, *sarkophagos*, flesh-eating, from σάρξ, *sarx*, flesh + φαγεῖν, *phagein*, to eat). Any large coffin designed not to be buried, but to be placed in the open air or in a tomb where it may be seen. The material is usually stone. The name was derived from the ancient belief that coffins made from a certain stone found near Assos possessed the property of consuming the body with the exception of the teeth within forty days. Egypt is probably the place of origin. Here the sarcophagus is the dwelling of the dead. In the great tombs of the pyramid-builders and later kings it is a huge block of granite in which is hollowed a receptacle for the mummy case, while another block forms the cover. The original idea of the house is sometimes indicated by the rounded roof. In less prosperous times and in poorer tombs the sarcophagi are of clay or of wood, often elaborately painted or decorated with inlaid work in glass and paste. About the seventh century B.C. another form of stone sarcophagus is found which reproduces the mummy case, showing the human head and outline of the swathed form. This type is especially common in Phœnicia and Phœnician lands, such as Cyprus, Carthage, and some of the Sicilian settlements. Especially noteworthy is a large group of these 'anthropoid' sarcophagi made of white Greek marble, and showing clear proof in the human heads, sculptured in relief on the lids, of Greek workmanship. This series begins shortly after the Persian wars and continues down to about the time of Alexander the Great. Among the Greeks the use of sarcophagi seems to have been borrowed from the East, and appears first in Asia Minor. In general, the Greek and Asiatic sarcophagi are distinctly of the house or temple type, often showing in relief the gables, columns, and other architectural details. On the early sarcophagi of Cyprus these forms are less clear, and the custom of decorating the sides with scenes in relief is found. In Greece sarcophagi proper were not used till late in the fifth century and do not seem to have been very generally employed at any time. Greek sarcophagi are consequently not numerous, and the finest specimens were found in a tomb at Sidon in 1887. Of the seventeen sarcophagi, one is an Egyptian anthropoid, and the others Greek, four of them being richly decorated with reliefs. The earliest of these, 'the sarcophagus of the Satrap,' belongs to the time shortly after the Persian wars, and shows Ionic art of the transitional period. The 'Lycian Sarcophagus' is evidently of the end of the fifth century and inspired by the sculptures of the Parthenon. To the earlier fourth century belongs the 'Sarcophagus of the Mourners,' which is in the form of a temple, between the columns of which are standing or seated women, whose faces and attitudes are the embodiment of woe.

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It is clearly the work of an artist who was familiar with the great Athenian grave-reliefs. Lastly, near the end of the fourth century, was produced the wonderful 'Alexander Sarcophagus,' with its vigorous scenes of the battle and the chase, reproduced in a striking combination of relief and color.

The Etruscans early employed sarcophagi of stone or clay, with the sides decorated in relief, while on the lid recline the full-length figures of the dead, singly or not infrequently in pairs. The work is that of the Etruscan artist, but he evidently drew his inspiration from Greek sources. Owing to the Roman custom of burning the dead, sarcophagi are very rare during the Republic and early Empire. The finest and earliest example is the peperino sarcophagus of L. Cornelius Scipio Barbatus, consul B.C. 298, in the Vatican. The house form has here passed over into a style much more nearly resembling an altar. In the second century of our era, however, burial became much more common, and with this period begins the long series of sculptured sarcophagi so common in museums. In general the achitectural forms are entirely neglected, nor is the Etruscan imitation of the bed retained, even when there is a reclining figure on the lid. Moreover, while the Greek sarcophagi seem in general to have stood in the open air as grave monuments, and hence were sculptured on all sides, the Roman, like the Etruscan, were placed against the walls of tomb chambers, so that the back is usually plain. Along with the usual rectangular oblong box we find an oval usually decorated with vertical waving lines, while on the front is a medallion containing a mythological scene or a portrait. In the Roman sarcophagi the decoration of the front with an elaborate composition in relief plays an important part. The choice of scenes is varied. Sometimes the theme is drawn from daily life, but more often the mythology of Greece has been used. The custom was continued in Christian times, with the substitution of biblical scenes for those of pagan myths. Consult: Hamdi Bey and Reinach, *Une nécropole royale à Sidon* (Paris, 1892 et seq.); Robert, *Die antiken Sarkophagreliefs* (Berlin, 1890-97).

SARD (Lat. *sarda, sardius*, from Gk. σάρδιος, sardios, Sardian, from Σάρδεις, *Sardeis*, Sardis, capital city of Lydia). A translucent red variety of chalcedony that differs from carnelian by the deepness of its color. It was highly prized by the ancients, who used it as a gem. It was credited by early writers with numerous virtues, and, according to Epiphanius, it conferred upon its wearer a "cheerful heart, courage and presence, and protected him from witchcraft and noxious humors."

SAR'DANAPA'LUS (Lat., from Gk. Σαρδανάπαλος, corrupted from Assyrian *Asshur-banipal*, Asshur begets a son) (B.C. 668-624). The last great Assyrian monarch. The son of Esarhaddon (q.v.), he found himself possessed of the empire in its greatest extent, but also the heir of the difficulties which were pressing on the east and north from the hordes of Cimmerians, Scythians, and Medes. The father died at the beginning of his third campaign in Egypt, and the duty of continuing the war devolved upon the son. Memphis was occupied and the land returned to its nominal allegiance, but upon the withdrawal of the army revolt broke out, which resulted in another invasion and the ruthless destruction of Thebes, the southern capital. But the Assyrian hold was so weak that Psammetichus declared his independence within a few years, and Egypt was irrevocably lost to Assyria (about B.C. 663). A long siege of Tyre begun by Esarhaddon resulted in capitulation. Tiresome wars in Elam, on the north, and in Arabia, disturbed much of the reign. The most serious blow to the safety of the empire came with the bold insurrection of Shamash-shum-ukin, a younger son of Esarhaddon, who had been made Regent of Babylonia by his father as a sop to the pride of that land. After a bitter and protracted struggle, in which Elam helped the rebel, the latter was defeated and perished, and his adherents were cruelly punished. To this punishment of Babylonia belongs the colonization of Samaria attributed by Ezra iv. 10 to 'Asnapper,' which is a corruption of Asshurbanipal's name. Asshurbanipal's policy as a warrior seems to have been purely defensive. He soon felt the impossibility of holding Egypt, refused assistance to Gyges of Lydia in his struggle with the Cimmerians, and was content with maintaining the old lines of his empire as intact as possible against the barbarian swarms which broke into the kingdom upon his death. His greatest fame as a monarch rests in his works of peace. He built magnificently, both in Nineveh and in the sacred cities of Babylonia, neglecting his political duties for those of a religious devotee and a litterateur. In his palace at Nineveh he gathered a great library, in which were deposited copies of the ancient literature of the south, and to which his scholars added their own contributions. (See NINEVEH.) It is to this wonderful collection, discovered again by Layard and Rassam, that modern science owes much of its knowledge of Babylonian literature and religion. The King's magnificence left its impression upon later tradition, and he is one of the few Assyrian kings distinctly mentioned by the Greeks, although his memory is distorted by legends and errors which make of him a mere Sybarite. The classical story of his self-destruction in a great funeral pyre is probably based on the fate of the last King, Sin-shar-ishkun. For the history, consult: George Smith, *History of Assurbanipal* (London, 1871), and the histories of Assyria; for the inscriptions, Jensen, in *Keilinschriftliche Bibliothek*, ii. (Leipzig, 1889); Bezold, *Kurzgefasster Ueberblick über die babylonisch-assyrische Litteratur* (Boston, 1886); for the buildings and library, Layard, *Nineveh and Its Remains* (London, 1848), and *Monuments of Nineveh* (ib., 1849); Hilprecht, *Explorations in Bible Lands* (Philadelphia, 1903).

SAR'DES. An ancient city of Asia Minor. See SARDIS.

SAR'DICA, COUNCIL OF. A council held, probably in the year 343, at Sardica, in Illyria, the present Sofia. It was summoned by the emperors Constantius and Constans, in concert with Pope Julius I., for the purpose of discussing the difficulties arising from the deposition of Saint Athanasius and other bishops, and generally testifying against innovations in doctrine in regard to the person of Christ. It also went into questions of discipline, and passed a number of canons which have been famous and important in the subsequent history of the Church. By

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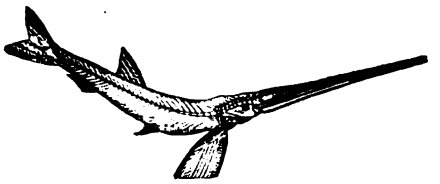
some scholars, such as Baronius and Mansi, an ecumenical character has been attributed to it, but this is denied by the great majority.

SARDINE (Lat. *sardina, sarda,* from Gk. σαρδήνη, σάρδα, sardine, from Σαρδώ, *Sardō,* Sardinia). One of the small fishes of the herring family (Clupeidæ) which are preserved in oil and canned; properly, the European *Clupea pilchardus,* very common in the Mediterranean and adjoining ocean, appearing in great shoals. Many young fishes of related species, however, are also utilized in the same way and mixed with them. In curing sardines they are first carefully eviscerated, washed, and then exposed to the sun or to a current of air under cover. They are next put into boiling oil in which they remain for a short time, then taken out, drained, and put into square tin boxes. The boxes packed with sardines are filled up with oil, the lid is soldered on, and they are placed for a short time in boiling water or exposed to hot steam. In the south of France sardines are sometimes cured in red wine, and then known as 'sardines anchoisées.'



A FOSSIL SARDINE.

Several species of small Clupeidæ much resembling the sardine are found in various parts of the world, and are used in the same way as the sardine of the Mediterranean. The California sardine (*Clupea cœruleus*) closely resembles the European sardine, gets about 12 inches long and is an excellent food-fish, but is not canned. The sardine fisheries are very extensive, both in America and Europe. (See FISHERIES.) In the Eastern States the young of several small fishes have been put up in oil, like sardines, especially young menhaden, and sold under various trade names. They are cheap and acceptable, but not so good as true sardines. Consult: Goode, *Fishery Industries,* section i. (Washington, 1884). Compare ANCHOVY. See PILCHARD; and Plate of HERRING AND SHAD.

SARDIN'IA (It. *Sardegna,* Gk. Σαρδώ, *Sardō*). An island belonging to Italy, next to Sicily the largest island in the Mediterranean Sea. It is situated between latitudes 38° 52′ and 41° 16′ N., and between longitudes 8° 8′ and 9° 49′ E., south of Corsica, from which it is separated by the Strait of Bonifacio, nine miles wide (Map: Italy, C 7). The nearest point of the Italian mainland lies 115 miles northeast of the northeastern extremity of the island. Sardinia has roughly the shape of an oblique parallelogram with an extreme length of 168 miles and a width of 89 miles. Its area is 9294 square miles, including the small islets along the coasts.

The greater part of the island is mountainous, especially along the eastern coast, but it is less elevated than Corsica. The highest point is Monte Gennargentu, near the centre of the island, with an altitude of 6365 feet. The southwestern mountain group, containing the richest mineral deposits, is separated from the remaining highland by the low plain of Campidano, running with a breadth of 12 miles between the Gulfs of Cagliari and Oristano. The rivers of Sardinia are all unimportant. The climate is mild, like that of the other Mediterranean lands, and very warm in summer. The average annual rainfall is only 17 inches, and the summers are very dry. Large portions of the island are subject to malaria. In spite of the drought, the vegetation is rich, and forests still cover about one-fifth of the area. The date palm is here indigenous. Geologically the island consists almost wholly of crystalline rocks with granite predominating. The plain of Campidano is covered with Tertiary deposits, and there are small areas of older sedimentary rocks. The chief mineral veins are found in the porphyritic flows in the southwest.

Some of the mines were worked by the Carthaginians and the Romans. Mining was resumed in the nineteenth century and has assumed extensive proportions. It now gives employment to about 12,000 persons. The principal minerals are lead, silver, zinc, copper, magnesium, antimony, lignite, granite, and salt. The last is a State monopoly. The value of the annual mineral output is over $3,000,000.

Sardinia is, like Sicily, an agricultural country with a fertile soil, but the agricultural conditions differ greatly in the two islands. The minute holdings of Sardinia present a striking contrast to the extensive estates and the large proportion of the landless class of Sicily, while the gradual adoption of modern methods in the former island compares favorably with the backwardness prevailing in the latter. The raising of cereals shows a downward tendency, while the area under vineyards is constantly increasing, amounting in 1900 to more than 200,000 acres, and yielding an average annual output of about 5,000,000 gallons of wine. Viticulture has attained a very high state of development in Campidano, in the Province of Cagliari. Olives are cultivated on the western coast. Stock-raising is also progressing, and the native breed of cattle is being improved by importations from abroad. The tunny fisheries are showing signs of decline.

Sardinia exports principally minerals, wine, olives, salt, fish, and charcoal, and imports cotton and woolen goods, coal, iron products, and various manufactures. Since the conclusion of the Franco-Italian treaty in 1898 the commerce is growing. The island is well provided with transportation facilities and has a considerable coastwise shipping. It is divided into two provinces, Cagliari and Sassari. Education is at a low ebb, although considerable progress, especially in technical instruction, has been made of late. There are universities at Cagliari and Sassari. The population was 682,002 in 1881, and 791,754 in 1901. The capital is Cagliari (q.v.).

ETHNOLOGY. Owing to their isolation, the Sardinians are one of the most homogeneous ethnic groups in Europe. They have the shortest stature, many of them measuring only 50 to 60 inches, the brownest eyes and hair, less than one per cent. being fair-complexioned, and the longest heads of all the Italian populations. The height of Sardinian soldiers is given as 1.619 meters (63.5 inches). An older, dwarfish race is revealed by ancient graves, the skulls from which measure only 1150 cubic centimeters.

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HISTORY. Sardinia, at first called by the Greeks Ichnusa and Sandaliotis, from its resemblance to a human footprint, and afterwards Sardo, a word of Phœnician derivation, was colonized at a very early period. Archæologists have thought they found remains of a very ancient Phœnician occupation and perhaps of a subsequent one by Egyptians, but these are largely speculations, as are the surmises concerning the primitive inhabitants. The first really historical event is the partial conquest by the Carthaginians about B.C. 550. They made the island a great corn-producing country. They practically completed the conquest in B.C. 260, but in 239, when Carthage was threatened by a revolt of her mercenaries, Rome accepted the island from the mutinous troops, and made it a province of the Republic. It was not reduced to complete submission until B.C. 235. It was guarded with care by Rome, as a natural part of her western Mediterranean domain and as one of the valuable granaries of the capital.

Sardinia fell into the hands of the Vandals in A.D. 458, and was subjected to the Eastern Empire in 533, but finally fell into the power of the Saracens about the middle of the eighth century. These were driven out in their turn by the Pisans and Genoese in the eleventh century, and the island was bestowed by the Pope upon Pisa, one of whose deputy governors obtained the erection of Sardinia into a kingdom (1164) by Frederick I. Frederick II. made his son Enzio King of Sardinia in 1238, but in 1250 the Pisans reconquered the island. The popes, who had long claimed a right of suzerainty over the island, gave it in 1296 to James II. of Aragon, and it continued in the possession of Spain till 1708, when it fell into the hands of the British. By the Peace of Utrecht (1713) it was given to the Elector of Bavaria and by him transferred to Austria in the following year in exchange for the Upper Palatinate. In 1720 Austria gave it to the Duke of Savoy in exchange for Sicily, and it has since that time formed a part of the dominions of the House of Savoy.

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SARDINIA, KINGDOM OF. A former Italian kingdom, and the nucleus of the present Kingdom of Italy. It included the duchies of Savoy, Aosta, and Genoa, the former Duchy of Montferrat, part of the old Duchy of Milan, the Principality of Piedmont, the County of Nice, and the islands of Sardinia and Caprera.

The modern Kingdom of Sardinia was originated by a treaty (August 24, 1720) between Austria and the Duke of Savoy (q.v.), by which the latter agreed to surrender Sicily on receiving in exchange the island of Sardinia, and the erection of his States into a kingdom. Of the kingdom thus constituted the island which gave its name was held in slight regard, the principal territories being on the mainland. The active life of the kingdom was in Piedmont (q.v.), where was Turin, the royal capital, and Piedmont is frequently referred to in nineteenth-century history instead of Sardinia. In 1730 Victor Amadeus I., the last Duke of Savoy and first King of Sardinia, resigned the throne to his son, Charles Emmanuel I. (1730-73). The latter, by joining with France and Spain against Austria, obtained (1738) the territories of Tortona and Novara, to which were further added (1748) the County of Anghiera and other districts. Charles Emmanuel was the author of the code known as the *Corpus Carolinum*. During the reign of Victor Amadeus II. (1773-96) the French Revolutionary armies invaded Savoy, and the victories of Napoleon led the King to conclude peace in 1796 at the sacrifice of Savoy and Nice. Cuneo, Alessandria, and Tortona were garrisoned by French troops. Charles Emmanuel II. (1796-1802) was at first an ally of France; but the Directory in 1798 compelled him to give up Piedmont, which in 1802 was incorporated with France. In that year Victor Emmanuel I. succeeded Charles Emmanuel, his realm being limited to the island of Sardinia. The Congress of Vienna (1814-15) reinstated the House of Savoy in its former possessions, to which the territories of the extinguished Republic of Genoa were added. Victor Emmanuel I. (1802-21) made his entry into Turin May 20, 1814. His return restored the ancient misgovernment; and the reactionary policy in this and other Italian States called forth the activity of the Carbonari (q.v.) and other secret associations, whose aims were supported by a portion of the nobility and army, and by the heir presumptive to the throne, Charles Albert, Prince of Savoy-Carignan. The military insurrection in March, 1821, brought on a general revolution. The King abdicated in favor of his brother, Charles Felix (1821-31), the Austrians came to the rescue of absolutism, and the revolutionary movement was quelled. On the death of Charles Felix the elder line of Savoy became extinct, and the succession fell to the cadet branch of Savoy-Carignan (see SAVOY, HOUSE OF), whose rights had been recognized by the Congress of Vienna, and Charles Albert (1831-49) ascended the throne. The liberals were gratified with some slight reforms, but the power of the clergy was untouched. The internal administration was, however, carried on with energy. In 1842 the King began a gradual but progressive liberal policy, relaxed the severity of the censorship, reformed the judicial administration and prison discipline, and abolished the feudal system in Sardinia. On February 8, 1848, the King announced a new and extremely liberal constitution, which was proclaimed some weeks afterwards; a Parliament was convoked in April. In the midst of these changes the Revolution in Southern and Central Italy broke out, and Charles Albert, who was saluted with the title of 'the Sword of Italy,' put himself at the head of the movement, and declared war against Austria. On the day after the fatal rout of Novara (March 23, 1849) Charles Albert abdicated, and was succeeded by his son, Victor Emmanuel II. The further history of Sardinia is merged with that of Italy (q.v.). Consult: Gallenga, *History of Piedmont*, translated from the Italian (London, 1856); Manno, *Storia moderna della Sardegna* (Florence, 1858); Ricotti, *Storia della monarchia piemontese* (ib., 1861-69).

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SAR'DIS, or **SAR'DES** (Lat., from Gk. Σάρδεις, *Sardeis*, Ionic Σάρδιες, *Sardies*, Σάρδις, *Sardis*). An ancient city of Asia Minor, the capital of Lydia, situated at the northern base of Mount Tmolus, on the Pactolus, 60 miles east-northeast of Smyrna (Map: Turkey in Asia, C 3). The city is first mentioned by Æschylus. It was taken by the Cimmerians in the reign of King Ardys (B.C. 680-631). In the reign of Crœsus, the last Lydian King, Sardis attained its highest prosperity. It became the residence of the Persian satraps after the overthrow of the Lydian monarchy. The Ionians burned it about B.C. 499, and a little later Xerxes assembled his vast army at Sardis for the invasion of Greece. It was of importance under the Romans. It is one of the seven churches mentioned in the Book of Revelation. The town was almost completely destroyed by Timur in 1402. Traces of the ancient city are still visible, notably the famous Ionic temple of Cybele and the tomb of Alyattes. *Sart*, the modern Sardis, is a poor village with a few straggling houses and tents of nomadic tribes.

SARDONYX (Lat. *sardonyx*, from Gk. σαρδόνυξ, sardonyx, from σάρδιος, *sardios*, sard, from Σάρδεις, *Sardeis*, Sardis, the ancient capital of Lydia in Asia Minor + ὄνυξ, *onyx*, onyx, nail). A variety of quartz. It resembles onyx and usually consists of layers of red (carnelian) and white (chalcedony). It finds some use as a gem, being employed for brooches and other forms of jewelry.

SARDOU, sär'doo', VICTORIEN (1831—). A French dramatist, born in Paris. He at first studied medicine, then history, taught for a time, and, failing in early dramatic efforts, of which *La taverne des étudiants* (1854) was the first acted, he became a hack journalist and writer. He fell into poverty, and was nursed through a fever by Mlle. de Brécourt, afterwards his wife, who introduced him to the noted actress and theatrical manager Mlle. Déjazet, for whom he wrote plays of ephemeral popularity, among them *Monsieur Garat* (1860). When he had once achieved notoriety Sardou produced comedies with astonishing rapidity, four in 1861, *Les pattes de mouche*, from Poe's *Purloined Letter*, *Piccolino*, *Les femmes fortes*, *Nos intimes*; three in 1862, *Les ganaches*, a satire on the republican agitation, *La papillonne*, *Les premières armes de Figaro*; and nearly a score in five years, all brilliant in dialogue, all genre pictures of modern social life, never serious or stern in moralizing, bitter only in *Les ganaches*, almost always successful. Of these the best is *La famille Benoîton* (1865). The same vein was pursued during the last years of the Empire (*Seraphine*, 1868; *Patrie*, 1869; *Fernande*, 1870), with a political digression in *Nos bons villageois* (1866). That Sardou was a sincere Bonapartist he showed after Napoleon's downfall in *Le roi Carotte* (1871) and *Ragabas* (1872), a fierce attack on Gambetta, with Napoleon III. and Garibaldi in the background. In 1878 he entered the Academy and in 1880 aroused clamor if not applause by *Daniel Rochat*, a plea for civil marriage, and (with Najac) *Divorçons*, a daring farce, which had a financial success then almost unparalleled in France. The plays of the eighties are more significant. *Odette* (1881) and *Fédora* (1882) show social and political satire developing into character-study, centred round a single figure, usually a woman. In this vein *Seraphine*, *Fernande*, and *Dora* (1877) were early experiments. *Théodora* (1884), *Georgette* (1885), and *La Tosca* (1887) lead up to the historic and spectacular dramas of the nineties (*Cléopâtre*, 1890; *Thermidor*, 1891; *Madame Sans-Gêne*, 1893; *Gismonda*, 1894; *Marcelle*, 1895; *Robespierre*, 1898; and *Dante*, 1903). Of this style *Patrie* (1869) and *La Haîne* (1874) were the forerunners. These later plays were composed to be heard and seen, not to be read, and they have not been published. Occasional scenes show literary elaboration, but the general effect is of exalted vaudeville. Sardou's importation into serious drama of sensation and spectacle has tended to corrupt the stage and to make it artificial and insincere. Critical notices of Sardou are in Lacour, *Trois théâtres* (Paris, 1880); Matthews, *French Dramatists* (New York, 1881); Sarrazin, *Das moderne Drama der Franzosen* (Stuttgart, 1888); Doumic, *Ecrivains d'aujourd'hui* (Paris, 1895).

SAR'GENT, CHARLES SPRAGUE (1841—). An American forester and botanist, born in Boston and educated at Harvard (class of 1862). He became director of the Arnold Arboretum at Cambridge in 1872, and in 1879 was appointed professor of arboriculture in Harvard University. Professor Sargent planned the Jesup collection of woods, now in the American Museum of Natural History, New York City, and described it in 1885. He edited the posthumous papers of Asa Gray in 1889, and wrote *Report on the Forests of North America* (1884), *Forest Flora of Japan* (1894), and the great work entitled *Silva of North America* (14 vols., 1891-1902).

SARGENT, EPES (1813-80). An American editor, poet, and dramatist. He was born at Gloucester, Mass., and was educated at the Boston Latin School, and at Harvard College. After a brief connection with the Boston *Advertiser* and *Atlas*, he went (1839) to New York as assistant editor of *The Mirror*, returned (1846) to Boston, where for several years he edited the *Transcript*, and then devoted himself to preparing school text-books and popularizations of literature. He wrote four dramas, *The Bride of Genoa* (1846), *Velasco* (1837), *Change Makes Change*, and *The Priestess*. The more noteworthy of his many juvenile or adolescent stories are: *Wealth and Worth* (1840); *What's to be Done?* (1841); *Fleetwood* (1845); and *Peculiar, a Tale of the Great Transition* (1863). His poems are collected in *Songs of the Sea* (1847), *Poems* (1858), etc. Among miscellaneous works may be named: *The Life and Services of Henry Clay* (1843); *American Adventure by Land and Sea* (1847); *Arctic Adventures by Sea and Land* (1847). He is chiefly remembered for the song, "A Life on the Ocean Wave."

SARGENT, HENRY (1770-1845). An American painter and soldier, born in Gloucester, Mass. He was educated at Dummer Academy, near Newburyport, and in Boston, and afterwards studied art in London under Copley and West. Some time after his return to Boston he became adjutant-general of the State of Massachusetts, and was aide successively to Governor Brooks and Governor Strong. He also represented Boston in the Legislature. His works include "Dinner Party," "Christ's Entrance into Jerusalem," "Landing of the Pilgrims," owned by the Pilgrim

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Society of Plymouth, and a portrait of Peter Faneuil, in Faneuil Hall, Boston.

SARGENT, JOHN SINGER (1856—). An American portrait and figure painter, born in Florence, Italy, January 12, 1856. He took a course of classical studies at Florence, where he was also enrolled as a pupil of the Academy, and as a youth made studies of the old masters. He traveled extensively with his parents, and at the age of eighteen became the pupil of Carolus Duran in Paris. He speedily acquired many of his master's best qualities, assisting him in his decoration of the Luxembourg, into which he introduced Duran's portrait. Among his first exhibited pictures "En route pour la pêche" (1878), a group of fisher girls upon the beach, and "Neapolitan Children Bathing" (1879) attracted much attention. Charming souvenirs of his visit to Spain in 1879, and of the influence of Velazquez, are the "Smoke of Ambergris" (1880) and "El Jaleo" (1882, Boston Museum), a Spanish dance. He continued to reside in Paris, exhibiting yearly at the Salon, until in 1884 he removed to London, where he has since resided. He has received the highest medals and honors, including the Grand Prix at the Paris expositions of 1889 and 1900, and is a member of the National Academy of Design, the Society of American Artists, the Société Nationale des Beaux-Arts, and the Royal Academy; in 1889 he was made chevalier, and in 1895 officer of the Legion of Honor. In 1887 and in 1889 he visited the United States, residing chiefly in New York and Boston.

Sargent's work is characterized by a singular truth of vision and readiness of hand. He has viewed widely the whole field of creative art, and has studied with a shrewd intelligence the methods and precedents of the past. The marvelous facility of hand and vivacity of vision that characterize his work seem to be the cumulative result of the knowledge thus acquired, in conjunction with a constant and conscientious reference to nature.

Among the best known of his portraits are those of Carolus Duran and Dr. Pozzi (1879); a "Young Lady" (1881); "Hall of the Four Children" (1882); "Madame Gauthereau" (1884); "Carnation Lily, Lily Rose" (1885, South Kensington Museum); Lady Playfair (1885); Henry Marquand (1887, Metropolitan Museum); Claude Monet (1888); Edwin Booth, Lawrence Barrett, and Joseph Jefferson, painted for the Players' Club (New York, 1890). He exhibited nine works at the Columbian Exposition (1893), among which were Ellen Terry as Lady Macbeth, and the charming portrait of young Homer Saint-Gaudens. His later sitters include Mrs. Meyer and her Children (1897); Wertheimer, the London art dealer (1898), and his daughters (1901); Col. Ian Hamilton (1899); Lady Elcho, Mrs. Adeane, and Mrs. Tenant (1900). In 1903 he again visited the United States, portraying President Roosevelt, Secretary Hay, and other notables at Washington, and a number of persons of Boston.

Although chiefly known as a portrait painter, Sargent has created figure pieces, like "Carmencita" (1890, Luxembourg), of the highest order, and his mural decorations in the Boston Public Library rank with the best work of the kind. He received the latter commission in 1890, and spent the winter of 1891-92 in making preparatory studies in Egypt. In 1892-94 he completed one of the ends of the great hall now named after him, with such success that his commission was extended to include the entire hall. The subject represented is the "Pageant of Religion," illustrating certain stages of Jewish and Christian history. In one end of the hall he has portrayed the triumph of monotheism over the polytheism of the ancient world, in weird allegorical representations, even making use of relief. Particularly impressive are the figures of the Hebrew 'Prophets' upon the side walls, in which he has created types worthy of comparison with those of Michelangelo in the Sistine Chapel. Consult Caffin, *American Masters of Painting* (New York, 1902).

SARGENT, LUCIUS MANLIUS (1786-1867). An American author, born in Boston. After graduating at Harvard, he studied law, but soon turned his attention to literary and philanthropic work. For thirty years he lectured on temperance, and in the same interest published *Temperance Tales*, a series of twenty-one stories, which began in 1835 and which passed through more than 100 editions. Among his other writings were: *Dealings with the Dead, by a Sexton of the Old School* (1856); *Reminiscences of Samuel Dexter* (1858); *The Irrepressible Conflict* (1861); and some poems. Consult Sheppard, *Reminiscences of Lucius M. Sargent* (1889).

SARGENT, NATHAN (1794-1875). An American journalist and politician, born at Poultney, Vt. After studying law, he began to practice at Cahawba, Ala., where in 1816 he was appointed county and probate judge. He lived in Buffalo from 1826 to 1830, when he went to Philadelphia to undertake the publication of a newspaper in the interest of the Whig Party. He afterwards became the Washington correspondent of the *United States Gazette*, writing under the signature of Oliver Oldschool; was Register of the United States Treasury in 1851-53, and was Commissioner of Customs from 1861 to 1867. His best known publication is *Public Men and Events* (1875), a book of character sketches containing some valuable information.

SARGENT, WINTHROP (1753-1820). An American soldier and pioneer, born at Gloucester, Mass. He graduated at Harvard in 1771, and during the Revolutionary War served in the patriot artillery, rising to the rank of major. After the close of the war he became interested in Western land schemes, and having been employed by Congress as a surveyor in what was afterwards the Northwest Territory, he was, in 1786, elected one of the two delegates from Suffolk County in Massachusetts chosen to aid in forming the Ohio Company. After its organization he was chosen secretary and in conjunction with Manasseh Cutler (q.v.) purchased land on its behalf. The next year Congress appointed him Secretary of the Territory. In 1798 he was appointed Governor of Mississippi Territory and took up his residence at Natchez. He died while on a voyage to Philadelphia. He was one of the authors of *Papers Relative to Certain American Antiquities* (1776), and in 1803 he published a poem entitled *Boston*.

SARGENT, WINTHROP (1825-70). An American author and lawyer, born in Philadelphia. He graduated at the University of Pennsylvania in 1845, and at the Harvard Law School in 1847,

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and later settled in New York City. He devoted much of his time to historical research and published works dealing with the Colonial and Revolutionary periods, including *History of an Expedition Against Fort Duquesne in 1755, Under Major-General Edward Braddock* (1856); *Life and Career of Major John André* (1861); *The Loyal Verses of Joseph Stansbury and Dr. Jonathan Odell* (1860); and *Loyalist Poetry of the Revolution* (1860).

SARGON, sär'gŏn. The name of an early Babylonian king and of a famous ruler of Assyria. (1) Sargon I. (*Shargani-shar-ali*), a Semitic ruler of Agade, the biblical Accad (Gen. x. 10), a North Babylonian city, at a date which, upon the authority of a late Babylonian statement and of archæological evidence, is placed by some scholars at B.C. 3800, while others place it 1000 years later. An interesting story resembling that of the youth of Moses and of Cyrus is told of his rise to power. He seems to have been the first to bring all Babylonia under the control of one Semitic dominion; at the same time he carried his arms far beyond the Euphrates Valley, claiming to have conquered Elam, and making progress into the west. His great buildings at Nippur, along with those of his son Naram-sin, likewise a redoubtable conqueror, have been unearthed by the University of Pennsylvania expeditions. Consult: Hilprecht, *Excavations in Bible Lands* (Philadelphia, 1903); Winckler, in *Keilinschriftliche Bibliothek*, iii. (Berlin, 1889); Rogers, *History of Babylonia and Assyria* (New York, 1901). (2) Sargon II. (*Sharru-ukin*, 'a god has established the king' —an etymological play on the name of the earlier conqueror, by which name he was also known), King of Assyria, B.C. 722-705. He followed Shalmaneser IV., but how he came to the throne is not known. His first achievement was the capture of Samaria, after its three years' siege by his predecessor (II. Kings, xviii. et seq.). However, he was not present at this triumph, being engaged with a rebellion raised by Merodach-baladan in Babylon, whom Sargon was unable to subdue. In the west rebellion soon broke out, led by Hamath in Central Syria and by Gaza, at the instigation of Egypt; but he defeated these foes at the battles of Karkar and Raphia (B.C. 720). The next decade was occupied with the laborious conquest of the aggressive State of Urartu to the north, which was annexed to the Empire, and with extensive conquests in Media. In B.C. 711 another rebellion broke out in South Syria, having its centre in Ashdod, Judah also being implicated (cf. Isa. xx.). But the cities which opposed Sargon's arms easily succumbed. He then undertook the subjection of Babylon, and drove out Merodach-baladan by brilliant campaigning, being finally recognized as the legitimate lord of the land (B.C. 709). His ability as a conqueror not only secured to him the traditional limits of the Assyrian Empire, but also extended them in every direction, and in the west into Cilicia, Cappadocia, and Cyprus. The last years of his reign were occupied with great building operations, notably in connection with a new capital, Dur-sharrukin, the modern Khorsabad (q.v.). He was succeeded by his son Sennacherib (q.v.). Consult: Winckler, *Keilschrifttexte Sargons* (Leipzig, 1889); Peiser, in *Keilinschriftliche Bibliothek*, ii. (Berlin, 1890); and the histories of Rogers and others.

SARK, särk, or **SERCQ**. The fourth in size, but most picturesque, of the Channel Islands (q.v.), 6 miles east of Guernsey (Map: France, D 2). It consists of Great and Little Sark, connected by the Coupée, a natural causeway, 150 yards long, 15 feet broad, and 384 feet high.

SARMATIANS, sär-mā'shanz. An ancient tribe who in the time of Herodotus (fifth century B.C.) lived between the Caspian Sea, the Don, and the Sea of Azov. Later they subdued the Scythians of the great plains north of the Black Sea, to which the name of Sarmatia was extended. They spoke the same language as the Scythians, and are now thought to have been one of a group of tribes of which the Scythians are the best known. Herodotus describes some of the ancient tribes of the Don as semi-civilized, while others were in the lowest stage of barbarism. Remains of the Sarmatians have been found in the burial mounds in their former habitat, and it is supposed by some that they were the ancestors of the Slavs (q.v.). Among the Sarmatian tribes were the Roxolani and the Jazyges. Some of the latter pushed as far west as the plains of modern Hungary.

SARMIENTO, sär'mê-ān'tô, DOMINGO FAUSTINO (1811-88). President of Argentina. He was born at San Juan in Argentina, and for some time lived as a teacher at San Luis. For opposing Rosas he was compelled to flee about 1830 to Chile, where he worked as clerk and teacher. He returned to San Juan in 1836, established a school there for girls, and edited a literary paper, but was imprisoned on a political charge, and forced once more to go to Chile. There he devoted himself to the question of public instruction, founded the first normal school in South America, and in 1845 was sent by the Chilean Government to visit the educational institutions of Europe and the United States. After 1847 he acted as the editor of several journals. In 1851 he returned to the Argentine Republic, and fought in the war against the dictator Rosas. To him was due the establishment of a Department of Public Instruction, of which he became Minister in 1860. In close succession he filled the offices of Minister of Interior, Governor of San Juan, Minister to Chile, and finally Minister to the United States from 1865 to 1868, when he was chosen President of the Argentine Republic. Among his important works are: *Viajes por Europa, Africa y América* (1848); *Argarópolis, ó la capital de los Estados Confederados* (1850); *Civilización y barbarie, ó Facundo Quiroga y Aldao* (1851). The results of his sojourn in America were his *Vida de Abrahán Lincoln* (1866), and *Las escuelas, base de la prosperidad en los Estados Unidos* (1868).

SARMIENTO DE GAMBOA, dâ gäm-bō'ä, PEDRO (c.1530-c.1591). A South American navigator, born in Galicia, Spain. He was sent in 1579 from Callao in Peru with a small fleet to intercept Drake, then cruising along the coasts of Peru and Mexico, and further to explore the Straits of Magellan. On his return to Spain in 1580 he gave King Philip a description of the locality, which decided him to fortify it as a stronghold, and a year afterwards Sarmiento and Diego Flores Valdez were sent there, in charge of a large expedition. Sarmiento established a colony at San Felipe, now known as Port Famine, but on his way back to Spain he was captured by the English, and he was not released until 1588.

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Only a few of the unfortunate colony escaped starvation.

SAR'NIA. A port of entry and the capital of Lambton County, Ontario, Canada, on the Saint Clair River and the Grand Trunk Railroad, opposite Port Huron, Mich., with which it is connected by a steam ferry and by a railroad tunnel beneath the river (Map: Ontario, A 5). It is the last port of entry for Canadian vessels bound to the upper lakes. Sarnia has manufactures of ale and beer, lumber, iron castings, machinery, woodenware, woolens, leather, etc. Population, in 1891, 6692; in 1901, 8176.

SARNO, sär'nô. A city in the Province of Salerno, Italy, situated on the Sarno, 12 miles by rail northwest of Salerno (Map: Italy, J 7). The city is dominated by the ancient castle of Count Francesco Coppola. Paper, silk, cotton, linen, and hempen fabrics are manufactured. The chief products are grain, olives, grapes, and sulphur. Sarno was a countship before it was incorporated with Naples. Near Sarno occurred a battle in 553, in which Narses defeated the Goths, and ended their reign in Italy. Population (commune), in 1901, 18,475.

SARPE'DON (Lat., from Gk. Σαρπήδων). (1) In Greek mythology, the son of Zeus and Europa. He became King of the Lycians, and his father gave him the privilege of living through three generations. (2) A Lycian prince, the grandson of the preceding, or, according to some, the son of Zeus and Laodamia. Homer represents him as an ally of the Trojans, distinguished for courage, and slain by Patroclus, after which Apollo rescued and purified his body and had it transported into Lycia for burial.

SARPI, sär'pê, PAOLO (1552-1623). An Italian historian and supporter of the Reformation. He was a Venetian by birth. He entered the Servite Order at the age of thirteen, taking the name of Frà Paolo, by which he is often known. He taught theology and philosophy with success, and studied other sciences eagerly, making some notable discoveries in anatomy. He was ordained priest, and in 1579 became provincial of his Order. He returned to Venice in 1588 and pursued his studies; but his intimate relations with the opponents of the Church caused some suspicion of his orthodoxy, and three applications for a bishopric were refused. On the outbreak of the conflict between the Republic of Venice and Paul V., he threw himself vigorously into the anti-Papal party, and became the official counselor of the Republic in ecclesiastical matters. Under his advice Venice banished the Jesuits from its territory. In 1606 he was summoned to Rome to appear before the Inquisition, but refused to obey. He maintained his relation with Protestant leaders in various countries, and began his *History of the Council of Trent*, which gives him his greatest fame, though it is so colored by his violent prejudices as to be thoroughly untrustworthy. It was published in London (1619) by Marcantonio de Dominis and at Geneva (1629), probably by Diodati. For his biography, consult lives by Robertson (London, 1894), Campbell (Turin, 1875), Balan (Venice, 1887), Pascolato (Milan, 1893); Trollope, *Paul the Pope and Paul the Friar* (London, 1860); Fontanini, *Storia arcana della vita di P. Sarpi* (Venice, 1803).

SARPSBORG, särps'bôr-y'. A town of the Province of Smaalenene, Norway, on the right bank of the Glommen, 68 miles by rail south-southeast of Christiania. Its port on the Christiania Fiord is Sannesund. The town is regularly built. To the north lies the lake of Glengshölen; to the east are the immense falls of the Glommen, 140 feet broad and 74 feet high. The town owes its importance to the utilization of this natural power for mills. There are calcium carbide, wood pulp, paper, aluminum, spinning, weaving, and saw mills. Population, in 1900, 6888. Sarpsborg was founded in the eleventh century and was destroyed by the Swedes in the sixteenth century. The new town dates from 1840.

SAR'RACE'NIA, SIDE-SADDLE FLOWER, or PITCHER PLANT. A genus of singular marsh plants, natives of North America. *Sarracenia purpurea* is common from Hudson Bay to South Carolina; the other species, of which there are four or five, are confined to the Southern States. They are perennial herbs with radical leaves and scapes, which bear one or more large flowers. The leafstalks are hollow and urn-shaped, the blades articulated at their apices, and fitting like a lid—a form which suggested the popular names. The genus is the type of the small natural order Sarraceniaceæ, of which the other genera are Heliamphora, which has been discovered in Guyana, and Darlingtonia in California. All the species are insectivorous through their peculiarly modified leaves. Consult Darwin, *Insectivorous Plants*.

SAR'RACE'NIA'CEÆ. An order of plants. See SARRACENIA.

SARRAU, sä'rô', JACQUES ROSE FERDINAND EMILE (1837—). A French physicist and engineer, born in Perpignan and educated in Paris at the Ecole Polytechnique. In 1878 he became director of the central depot for saltpetre and powder, was named chief engineer in 1879, became professor of mechanics in the Polytechnic in 1883, was elected to the Academy of Sciences in 1886, and in 1897 was promoted to the rank of inspector-general. Sarrau's especial study was explosives, and with Vieille he invented a registering pressure gauge. In physics his main research was on the compressibility of gases (Paris, *Comptes Rendus* (1882, et seq.), and he determined the critical point of oxygen. Among his writings besides contributions to periodicals are *Les effets de la poudre et des substances explosives* (1874-76), *Cours de mécanique* (1888-89), *Cours d'artillerie* (1893), and *Théorie des explosifs* (1893-95).

SARSAPARILLA (Sp. *zarzaparilla*, *zarzaparrilla*, sarsaparilla, from *zarza*, bramble, from Basque *sartzia*, bramble + **parilla*, **parrilla*, diminutive of *parra*, trained vine, or from *Parillo*, name of a physician said to have been the first to employ it). This medicine, formerly much used, is the produce of several species of Smilax (see SMILACEÆ), *Sarsaparilla officinalis*, *Sarsaparilla medica*, and other undetermined varieties. They are woody vines with prickly angular stems; the first with large ovate-oblong, acute, heart-shaped, leathery leaves; the second with shortly acuminate smooth leaves, the lower ones heart-shaped, the upper ones approaching to ovate. The shrubs are natives of warm parts of America, *Sarsaparilla officinalis* being found in South America and *Sarsaparilla medica* on the Mexican Andes. Some botanists regard them as mere varieties of one species.

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The part of the plant used in medicine is the dried roots, which are of about the thickness of a goose-quill, generally many feet in length, reddish brown, covered with rootlets. They are folded in bundles about 18 inches long, are scentless, taste mucilaginous, feebly bitterish, faintly acrid. Sarsaparilla was formerly considered a diaphoretic, diuretic, and alterative, and was used extensively, especially in syphilis and rheumatism. It is now known to be practically inert, and aside from its use as a vehicle for potassium iodide in the form of the compound syrup of sarsaparilla it is chiefly employed in 'spring medicines' and other much advertised 'blood-purifiers,' which are harmless as far as the sarsaparilla is concerned and profitable to their makers. See SMILAX.

SAR'SEE'. A small detached tribe of Athapascan stock (q.v.), originally a part of the Beaver Indians of Peace River, but later taking refuge for protection with the Blackfeet, and now settled upon a reservation upon the headwaters of the Saskatchewan, near Calgary, Alberta Province, Canada. They are described as lazy, degraded, and demoralized generally, yet law-abiding. They number about 230, of whom 30 claim to be Christians.

SARS'FIELD, PATRICK, Earl of Lucan (1645-93). An Irish Jacobite soldier. He was born at Lucan, near Dublin; received a military education in France; entered the English army and rose to the rank of colonel in 1686. He served under Monmouth in France, but was in the victorious army when Monmouth was defeated at Sedgemoor. He was a Roman Catholic and at the revolution was a member of Parliament. He supported King James II. in his effort to retain the crown, accompanied him to France, and thence to Ireland, and fought at the battle of the Boyne. William III. was forced by him to raise the siege of Limerick in 1690. In 1691 he commanded the reserve at Aughrim, and after a gallant defense of Limerick obtained fair terms of surrender and was allowed to retire to France, where he became maréchal de camp in the French service. He distinguished himself at the battle of Steenkirke in 1692, and at Neerwinden in 1693, where he was wounded, dying shortly afterwards.

SARTAIN, sär-tān', JOHN (1808-97). An English engraver and editor, active chiefly in America. He was born in London, October 24, 1808. He studied line engraving under John Swain, and while yet a lad illustrated Otley's Early Florentine school (1826). In 1828 he began to practice mezzotint, which he was the first to introduce into America. In 1830 he emigrated to Philadelphia, where he developed a prodigious activity, not only in his profession, but as editor of two magazines and in serving as a member and councilor of many societies of art. As an engraver he has left works of considerable value. Two of the largest and most important plates are "Christ Rejected" (1862), after Benjamin West, and "The Iron-Worker and King Solomon" (1876), after Christian Schuessele; among others are those of Penn and Martin Van Buren, after Inman, and Henry Clay, after John Neagle. He also practiced portrait painting in oil and miniature painting on vellum and ivory, though with less success, and designed several public monuments, the principal of which is the Washington and Lafayette Monument in Philadelphia. Among his numerous important positions was that of chief administrator of fine arts at the Centennial Exhibition in Philadelphia in 1876. He died in Philadelphia, October 25, 1897, leaving a family of talented children.

EMILY SARTAIN (1841—), mezzotint engraver, etcher, and portrait and genre painter, studied at the Pennsylvania Academy, and with Luminais in Paris. She has engraved a number of framing prints, besides many portraits for book illustrations. Her painting "Reproof" (1876) gained a medal at the Centennial Exposition. From 1881 to 1883 she was editor of *Our Continent*, and since 1886 has been principal of the Philadelphia School of Design for Women. In 1900 she was sent to Paris by the United States Government as delegate to the International Congress on Instruction in Drawing.

SAMUEL SARTAIN (1830—), engraver on steel, son and pupil of John Sartain, has been chiefly engaged in engraving portraits and other plates for book illustration. His prints include "Clear the Track," after Christian Schuessele (1854); "Christ Blessing Little Children," after Sir Charles Eastlake (1861); the "Song of the Angels," after Thomas Moran; and various portraits after Thomas Sully, John Neagle, and others. Consult John Sartain, *Reminiscences of a Very Old Man* (New York, 1899).

SARTAIN, WILLIAM (1843—). An American landscape and genre painter. He was born in Philadelphia, the son of John Sartain, the engraver, under whom he worked until 1867. From 1867 to 1869 he studied under Christian Schuessele and at the Pennsylvania Academy, after which he went to Paris, studying under Yvon and Bonnat. He sketched throughout Europe and in Algiers, first exhibiting at the Royal Academy, London, in 1875, returning to the United States in the following year. Sartain is professor of the life class of the Art Students' League, New York City, and is one of the original members of the Society of American Artists. Among his works in oil are an "Italian Head" (1876); "Narcissus" (1878), Smith College, Massachusetts; and "Lucia, Near Algiers;" in water-color are an "Arab Café" (1880), and a "View of the Ghetto, Venice." "In the Hackensack Valley" and the "End of Day" are examples of his latest works.

SARTHE, särt. A northwestern inland department of France, north of the Loire (Map: France, F 4). Area, 2396 square miles. Population, in 1896, 425,077; in 1901, 422,699. It is a region of plains traversed by low hills and by undulations and watered by the River Sarthe. Agriculture is the leading industry; mining and manufacturing are also important. Capital, Le Mans.

SARTI, sär'tē, GIUSEPPE (1729-1802). An Italian composer, born at Faenza. He studied under Padre Martini at Bologna, and in 1751 produced his first opera, *Pompeo in Armenia*, which was performed at Faenza with great success. His principal operas were *Le gelosie villane* and *Giulio Sabino*. In 1779 he became *maestro di cappella* of the Milan Cathedral, and thereafter limited himself to the composition of church music. In 1784 he went to Saint Petersburg as music director to the Court of the Empress Catharine. His operas are 30 in number; but

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the only composition by which he is now known is his beautiful sacred terzett, *Amplius Lava Me.*

SARTO, sär'tô, ANDREA DEL (1487-1531). A Florentine painter of the High Renaissance, the greatest colorist of the school. He was born at Gualfondo, near Florence, July 16, 1487, the son of Angelo, a tailor (Sarto), whence the name usually given him. In 1504 his father went to Florence and apprenticed his son to a goldsmith. The lad's talent having attracted the attention of Giovanni Basile, a local painter, the latter instructed him, afterwards placing him with Piero di Cosimo. Andrea learned more, however, from the cartoons of Leonardo da Vinci and Michelangelo then exhibited in the Sala del Papa. In the Sala del Papa he met Franciabigio (q.v.), with whom he was associated until about 1512. In 1508 he became a member of the Painters' Guild, and in 1513 occurred his supposed disastrous marriage with Lucretia del Fede, the beautiful young widow of a hatmaker.

Vasari's account of this lady has taken strong hold of the popular imagination—witness Browning's celebrated poem—and is even accepted by biographers. We are told that she was the evil genius of his life, hindering his work, racking him with jealousy, wasting his substance. There is, however, no evidence confirmatory of Vasari's statements; whatever there is, goes to disprove them. His dislike was, perchance, due to the blows which he tells us the vixenish lady was wont to inflict upon her husband's pupils, of whom he was one.

Before his journey to France Andrea was considered a famous painter and had been intrusted with important fresco commissions, which he completed after his return to Florence. In these frescoes his progress as an artist may best be traced. In Santa Annunziata, the church of the Servites, he painted, 1509-14, seven of the ten frescoes in the cloister. Five are scenes from the life of Filippo Benozzi, founder of the Order; but the finest are the "Adoration of the Kings" (1511), and especially the "Birth of the Virgin" (1514), which, although the composition is imitated from Ghirlandajo, shows all of Andrea's best qualities. In the lunette over the entrance to the cloister he painted the celebrated "Madonna del Sacco," in reality a "Holy Family," and so called from the sack of corn upon which Joseph sits reading to the beautiful and dignified Madonna. This picture is the acme of Andrea's coloristic production in fresco. Another famous series of ten scenes from the life of John the Baptist, in the cloister of the Scalzi, was executed in brown monochrome, 1511-26. The absence of color in this work incited the artist to display his great gifts of composition and narrative power. In the refectory of the Convent of San Salvi he painted, besides earlier panels, his celebrated fresco of the "Last Supper"—the only representation of the subject worthy to be compared with Leonardo's. He has chosen the moment subsequent to that depicted by Leonardo, when Christ and Judas dip their bread into the dish. Less monumental and impressive than his predecessor's, his representation is fresh in treatment, brilliant and soft in color. The former's celebrated portrayal of the action by means of the hands is almost equaled by his follower.

Andrea's easel pictures may best be studied at Florence. Among those in the Pitti Palace are the "Annunciation" (1512), "Disputa," two "Holy Families" (1523 and 1529), a large "Pietà," the "Adoration of the Virgin," and several portraits, including one of himself and wife, also ascribed to Franciabigio. The best known in the Uffizi are "Madonna of the Harpies" (see MADONNA), "Saint James Caressing Little Children," and two portraits of himself. In the Academy of Florence is a picture of stately saints; and in the Cathedral of Pisa, Saints Catharine, Margaret, and Agnes are among the most charming female figures Andrea ever painted. Dresden possesses "Abraham's Sacrifice" (replica at Madrid); the Louvre his "Charity" and a "Holy Family;" Berlin a portrait of his wife and a "Madonna with Saints" (1528).

Andrea died of the plague January 22, 1531, and was buried in the church of the Servites, near his own frescoes. He was far the greatest colorist south of the Apennines, and his works will bear comparison with those of the great Venetian masters. Silvery in the frescoes and tending toward gold in easel pictures, his colors are always clear, luminous, and harmonious. He was an accomplished chiaroscurist, and in line he was second only to Michelangelo and Leonardo. His drawings, of which the best collections are in the Louvre and the Uffizi, are often essentially modern in character. Such technical merits, indeed, made him deserving of the title the "Faultless Painter;" he only lacked that sense of the truly significant possessed by the greatest geniuses. The effect of his work is often interfered with by the use of too much statuesque drapery.

Consult: Vasari, *Vite* (ed. Milanesi, Florence, 1880; English translation, Blashfield and Hopkins, New York, 1896); Biadi, *Notizie inedite della vita d'Andrea del Sarto,* etc. (Florence, 1830); Reumont, *Andrea del Sarto* (Leipzig, 1835); Janitschek, in Dohme, *Kunst und Künstler Italiens* (ib., 1876).

SARTORIUS VON WALTERSHAUSEN, sär-tō'rē-ụs fŏn văl'tĕrs-hou'zen, AUGUST, Baron (1852—). A German economist, born in Göttingen. He was educated in the University of Göttingen, became professor at Zurich in 1885, and in 1888 was called to a chair of economics in Strassburg. His principal works deal with American economic and industrial problems and include: *Die Zukunft des Deutschtums in den Vereinigten Staaten* (1885); *Nordamerikanische Gewerkschaften* (1886); *Moderner Sozialismus in den Vereinigten Staaten von Amerika* (1890); *Arbeitsverfassung der englischen Kolonien in Nordamerika* (1894); and *Handelsbilanz der Vereinigten Staaten von Amerika* (1901).

SARTOR RESARTUS. See CARLYLE, THOMAS.

SARTS. The term denoting the settled (farming and commercial) population of certain regions of Turkestan, Persia, and Afghanistan, as opposed to the nomadic. It has more of a topographical than of an ethnological significance, being applied sometimes to the Tadjiks, who are Aryans, and at others to the Uzbegs, who are of Turkic stock.

SART'WELL, HENRY PARKER (1792-1867). An American botanist, born in Pittsfield, Mass. His great herbarium came into the possession of Hamilton College. The last years of his life were spent on the study of the sedges, and in 1848 he published two parts of *Carices Americanæ Sep-*

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ANDREA DEL SARTO
"MADONNA OF THE HARPIES," FROM THE PAINTING IN THE UFFIZI GALLERY, FLORENCE

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tentrionalis Exsiccatæ, which was never completed.

SA'RUM, Old. A former city and borough and now a parish in Wiltshire, England, on a hill two miles to the north of Salisbury (q.v.). It dated from the time of the Romans, by whom it was known as *Sorbiodunum*, and remained an important town under the Saxons. A Witenagemote was held at Old Sarum in 960; and here William the Conqueror assembled all the barons of his kingdom in 1086. In 1220 the cathedral was removed to New Sarum, now Salisbury (q.v.), and was followed by most of the inhabitants. In Henry VII.'s time it was almost wholly deserted. Traces of walls and ramparts and of its cathedral and castle are still seen. Though without a house, two members represented it in Parliament till Old Sarum became proverbial as the type of a rotten borough. It was disfranchised by the Reform Bill of 1832. William Pitt, Earl of Chatham, first sat in Parliament for Old Sarum in 1735. Population of parish, 300.

SARZANA, särd-zä'nä. A city in the Province of Genoa, Italy, on the Magra, eight miles by rail east of Spezia (Map: Italy D 3). The Gothic cathedral, begun in 1355, is rich in paintings and marbles. The ancient citadel is used as a prison. There are a seminary and a technical school. Sarzana has manufactures of silk and glass; wine and olive oil are made. Population (commune), in 1901, 12,141.

SASKATCH'EWAN. A large river of Canada forming the upper course of the Nelson River (q.v.), together with which it forms one of the four great river systems of North America east of the Continental Divide (Map: Canada, K 6). It rises in the Rocky Mountains by two main branches, the North and South Saskatchewan, which unite near Prince Albert in Saskatchewan Territory, whence the main stream flows eastward to the northwestern corner of Lake Winnipeg. The main river has a length of 282 miles, and the total length, including the South Branch, is 1090 miles. The North Branch rises in the glaciers on Mount Hooker and flows east on the southern border of the forest country through the Territories of Alberta and Saskatchewan. The South Branch has several headstreams, some of which rise in the extreme northern part of Montana. Its course after leaving the mountains lies entirely within the Great Plains. It flows northeast through Alberta, Assiniboia, and Saskatchewan. Before entering Lake Winnipeg the main river flows through several lakes, the largest of which, Cedar Lake, is 30 miles long. Between Cedar Lake and its mouth it is interrupted by rapids. The whole river is narrow, and the South Branch is obstructed by shoals and sand bars. Steamers, however, ascend the North Branch to Edmonton, 850 miles from Lake Winnipeg, and smaller boats can go 150 miles farther to Rocky Mountain House.

SASKATCHEWAN. A district of Canada, lying northwest of Manitoba, between latitudes 52° and 55° N., embracing an area of 114,000 square miles (Map: Northwest Territories, H 4). The surface is a rolling prairie sloping to the east and broken at intervals by groups of hills, the most prominent being those paralleling the Saskatchewan River on the south. The northeastern half of the district is well wooded with forests of aspen poplar, pine, and spruce; the southwestern half is prairie land in the main, only the hills being wooded. The winters are very cold, but are free from blizzards, and the atmosphere is clear and exhilarating. The summers are warm, and, though short, permit the growth and maturing of many varieties of farm crops. Precipitation is light (about 13 inches), but is greatest in the growing summer months when it is most needed. Over the greater portion of the southern half the soil is very rich. Wheat, oats, barley, and the root crops thrive, the conditions being especially favorable for wheat, which is beginning to be extensively raised in the district. The Saskatchewan River (q.v.) is an important factor in the development of the district, inasmuch as it affords navigation the entire length of the region, and by way of Lake Winnipeg admits of water communication with the country to the south. With some expense in the removal of obstacles now in its course a navigable length of 1500 miles will be afforded, making possible a water communication with the coal fields to the west. Another means of communication has been established by the construction of the Qu'Appelle, Long Lake and Saskatchewan Railroad, which connects Prince Albert with Regina, on the trunk line of the Canadian Pacific Railroad. Lakes Winnipeg and Winnipegoosis, which project well into the eastern end of the district, are of value not only for purposes of navigation, but also for the enormous numbers of whitefish, pickerel, sturgeon, and other varieties of fish which they contain. Settlements in the district are most numerous in the southeast part and along the course of the Saskatchewan, the Prince Albert region in the centre of the district being the most highly developed. In 1901 the total population was 25,679. For governmental purposes it is a part of the Northwest Territories (q.v.). The seat of administration is Battleford.

SASSAFRAS (Sp. *sasafras*, variant of *salsafras*, *salsifrax*, *saxifraga*, from Lat. *saxifraga*, maidenhair, stone-breaker, from *saxum*, rock + *frangere*, to break), *Sassafras*. A genus of trees or shrubs of the natural order Lauraceæ. The sassafras tree (*Sassafras officinale*) of North

SASSAFRAS.

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America, found from Canada to Florida and west of Kansas and Texas, sometimes attains a height of 100 feet, has deciduous, entire, or three-lobed leaves, yellow flowers, and small dark-blue fruit. The wood is soft, light, coarse-fibred, dirty white and reddish brown, with a strong but agreeable smell, and an aromatic, rather pungent, sweetish taste. The thick spongy bark of the root contains a volatile oil, oil of sassafras, widely used as a flavoring for confectionery. The leaves are said to be used for flavoring soups, as well as for the abundant mucilage they contain.

SASSAN'IDÆ, or **SASSANIDS.** The last native dynasty of Persia, which ruled from about A.D. 226 until about 641. The Sassanids succeeded the Arsacidæ (q.v.), and derived their name from Sassan, the grandfather of Ardashir, the first ruler of this line. Ardashir I. came to the throne in 226 and reigned until 241. His father, Papak, was a princeling of Chir, not far from Istakhr (Persepolis), and obtained for his son from his suzerain, the Bazrangi King Gaochithra, the position of commander-in-chief of Darabgerd. This position was utilized by Ardashir to secure kingly power. He extended his sway with the help of his father, who murdered Gaochithra and declared his eldest son Shahpuhr (Sapor) King in defiance of the Parthian sovereign, Artabanus V. On Papak's death Shahpuhr was King for a short time, but being killed by an accident while engaged in an expedition against his brother Ardashir, the latter seized the throne. He put to death all his rivals, including his elder brothers, and crowned a series of minor conquests by the defeat and death of Artabanus at Hormizdagan in 224. Two years later the capital, Ctesiphon, yielded to him. In Armenia, however, which he invaded in 228, he met with no lasting success, and in Georgia the Arsacid dynasty was able to bid him defiance. An attack on the Romans was practically futile, despite his victories at Nisibis and Carrhæ in 237.

Ardashir was succeeded by his son Shahpuhr (Sapor) I. (241-272), who continued his father's policy. Undeterred by a defeat in 242 by the Roman Gordianus at Ras el Ain (Resaina), he secured by a treaty with Philippus, the successor of Gordianus, both Armenia and Mesopotamia (244). The great event of his reign was his victory over the Roman Emperor Valerian (q.v.) at Edessa (Antioch Callirhoë), in Northern Mesopotamia, in 260. In 261 Shahpuhr met with a reverse at the hands of Odenathus (q.v.), who took Carrhæ and Nisibis and threatened Ctesiphon itself. The invader was forced to retreat, however, and the remainder of Shahpuhr's rule was quiet and uneventful. The four following kings—Ormazd I. (272-273), Bahram I. (273-276), Bahram II. (276-293), and Bahram III. (293)—were not especially noteworthy; but Narses I. (293-303), a son of Shahpuhr I., after a temporary victory over Terdat (Tiridates) of Armenia, was finally defeated by Galerius in 296, losing not only Armenia and Atropatene, but Iberia also, which came under Roman control. Ormazd II. (303-309) was followed by his posthumous son, Shahpuhr II. (309-379), whose reign is one of the most noteworthy in the Sassanid period. It is marked in ecclesiastical history by bitter persecutions of the Christians begun in 342, arising from close affiliations of the Persian Christians with the Eastern Empire of Byzantium, an hereditary foe of Persia. War with Byzantium soon broke out, at first with varying success. In 345 Shahpuhr was utterly defeated at Singara. In 359 the war began anew, but, despite several victories in Armenia, the Persians made little real headway until Constantius was succeeded by Julian the Apostate (q.v.), who lost his life at Ctesiphon in 363. This victory restored to Persia all that she had lost, and indirectly added Iberia and other Caucasian provinces to her sway. The success of Shahpuhr reëstablished the glory of the Sassanids.

He was followed by his step-brother, Ardashir II. (379-383), and his son, Shahpuhr III. (383-388), who lost much of Armenia Minor and was killed in a mutiny, being succeeded by his brother, Bahram IV. (388-399). Yezdegird I. (399-420), whose reign, like the preceding one, was marked by petty events in Armenia, but who personally was upright and peaceful, was followed by Bahram V., surnamed Gur (420-438). In the beginning of his reign he conquered the Haital (Hephthalites, or White Huns), but a persecution of the Christians involved him in a war with the Byzantine Empire, which resulted in his defeat (421). His son Yezdegird II. (438-457) remained at peace with the west, but attempted to compel the Christian Armenians to give up their faith and crushed the Armenian forces at Avarayr in 451. He was followed by his two sons, Ormazd III. (457-459) and Firuz (459-484). The reign of the latter was marked by wars with the White Huns, against whom he made two expeditions, the first of which was unsuccessful, and the second disastrous, Firuz himself being slain near Balkh. His brother Balash (Vologeses) (484-488) succeeded him, but was deposed and followed by Kavadh (Kobad) I. (488-531), whose rule was interrupted for a short time by the usurpation of his brother Jamasp (496-498). In this reign Mazdak (q.v.) promulgated his doctrines, and as a result of his favor to them Kavadh was for a while deprived of his throne. He waged war with the Greeks and at one time Belisarius (q.v.), the general of Justinian, was his opponent. He was followed by his son Khosru (Chosroes) I. (531-579), surnamed Anushirvan, 'the Immortal Souled.' His reign was chiefly occupied with wars against the Byzantines. After a brief period of peace, Khosru invaded Syria in 540, vexed by the successes of his rival Justinian (q.v.) in Italy and Armenia and by his interference in Oriental politics. Belisarius, however, prevented him from doing serious injury, although a large Byzantine army under Narses was routed by the Persians in 543. The second Byzantine war dragged on from 550 until 557, when it practically ended with the defeat of the Persians at Phasis, near the Black Sea. Khosru then turned his arms against the White Huns, whom he conquered (557). In 572 a third Greek war was begun by Justin II., who refused to abide longer by the treaty which his uncle Justinian had made with Khosru. The Sassanid King overran Armenia, but suffered defeat in the plain of Melitene (Malitia). The Greeks then invaded Persia, and Khosru sued for peace, but died before the negotiations were completed. This reign marks the climax of the Sassanid dynasty, and the golden age of Pahlavi literature.

Khosru was succeeded by his son Ormazd IV. 578-590), whose reign was an unfortunate one. Not only were his wars in Armenia unsuccessful,

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but his general Bahram Chubin, who had been deposed from his command by Ormazd, revolted in 589. At the same time the King became suspicious of his son, Khosru Parwez, who implored the aid of the Emperor Maurice. Ormazd was dethroned and succeeded by Khosru (590-628). In 604, as the avenger of Maurice, who had been murdered by the Emperor Phocas, he took the field against the Greeks, who made but a feeble resistance to him, despite the efforts of Heraclius (q.v.). The Persians overran Armenia and in 614 penetrated Syria, and even conquered Egypt, which they held until 618. This was, however, the last conquest of the Sassanids. In 623 the tide turned and Heraclius inflicted defeat after defeat on Khosru, until in 627 the King was thrown into prison by one of his younger sons, Kavadh Sheroe, and murdered the year following. This son, who ascended the throne as Kobad II., after a reign of six months was the victim of a pestilence which devastated the country. He was followed by his infant son, Ardashir III. (629-630), who was murdered by Shahrvarez or Farrukhan, the Persian commander-in-chief, himself assassinated in less than two months. Rapid changes of rulers followed, and such was the anarchy in Persia at this time that between the death of Khosru II. in 628 and the accession of Yezdegird III. in 632 there were twelve occupants of the throne. Yezdegird III. (632-651), a grandson of Khosru, was the last of the Sassanids. At the time of his accession the Arabs were just entering upon their great career of conquest. After subjugating Syria they turned toward Persia. The Persians resisted bravely, but their forces were overthrown by those of the Caliph Omar at Kadisiyah (now Kadder) about 635. In the following year Ctesiphon fell, and a series of conquests gave the Arabs complete dominion over Persia. In 641 or 642 the defeat of the Persians at Nehavend terminated the reign of Yezdegird, who as a fugitive dragged out a miserable existence until he was murdered by a peasant for his clothing in 651.

The Sassanid rule was in general beneficial to Persia. The arts and sciences flourished, the government was just, and the ancient faith of Zoroaster, which had declined, was revived and restored almost to its pristine purity.

Consult: Rawlinson, *The Seventh Great Oriental Monarchy* (London, 1876); Nöldeke, *Geschichte der Perser und Araber zur Zeit der Sasaniden aus der arabischen Chronik des Tabari übersetzt* (Leyden, 1879); Casartelli, *Philosophy of the Mazdayasnian Religion Under the Sassanids* (Bombay, 1889); Justi, *Iranisches Namenbuch* (Marburg, 1895); id., "Geschichte Irans von den ältesten Zeiten bis zum Ausgang der Säsäniden," in Geiger and Kuhn, *Grundriss der iranischen Philologie* (Strassburg, 1900); Browne, *Literary History of Persia* (London, 1902).

SASSARI, säs'sä-rē. The capital of the Province of Sassari, in the northern part of the island of Sardinia, 10 miles from the Gulf of Asinara (Map: Italy, C 7). It has broad streets, spacious squares, and several fine modern buildings. The fifteenth-century cathedral has a richly sculptured façade. The university, founded in 1634, contains a natural history collection and a large library. There are several churches and palaces, a new theatre, a lyceum, a gymnasium, a seminary, and a technical institute. Sassari carries on a busy trade, chiefly with Genoa, in grain, wine, fruits, olive oil, and skins. There are manufactures of lead, zinc, matches, and leather. Population (commune), in 1881, 36,317; in 1901, 38,268. The port of Sassari is Porto Torres, 10 miles to the northwest, with a population, in 1901, of 4433.

SASSOFERRATO, säs'sō-fĕr-rä'tō, GIOVANNI BATTISTA SALVI (1605-85). An Italian painter, so called from his birthplace, the Castle of Sassoferrato, near Urbino. He was son and pupil of Tarquinio Salvi, and studied at Rome and Naples. He painted, besides his own portrait now in the Uffizi, only religious subjects. The "Madonna del Rosario" in the Church of Saint Sabina in Rome and a "Crucifixion" in North Cray Church, Kent, are his best works. Others, also simple and devout, are the "Adoration of the Shepherds" and "Joseph's Workshop," both in the Naples Museum, a "Magdalen" in Hampton Court Palace, and at the Louvre an "Assumption," two Madonnas, and a "Sleeping Child Jesus."

SASSULITCH, säs-sōō'lĭch, VERA (1853—). A Russian revolutionist. See ZASULICH.

SASTEAN, säs'tē-an, SHASTIKA, or SHASTA. One of the numerous small linguistic families of Indians who formerly lived in the California-Oregon region. They called themselves *Kútikĕkanać*. Their home was the region drained by the Klamath River and its tributaries from the western base of the Cascade range to the point where the Klamath flows through the ridge of hills east of Happy Creek. They extended over the Siskyou range northward as far as Ashland, Ore. They are now reduced to a mere handful, the most of them on the Grande Ronde and Siletz Reservations in Oregon. The men are smaller and weaker than the women, who are charged with about all the work of their industrial life.

SATAN. See DEVIL.

SATANISM. The cult of Satan and an important phase of occultism. From the character of its worship it is necessarily secret, and precise details are difficult to acquire. The impression which generally prevails, however, that Satanism is a recent and spasmodic outburst of diabolical sacrilege, is certainly incorrect. The cult is an old one, and in its origins reaches far back into primitive religion, while it is apparently a conglomerate of at least three entirely distinct components. Considering first the actual phenomena presented by Satanism, it may be said that the cult reaches its acme in the Black Mass, which stands to it in the same relation as stands the White (or Christian) Mass to the Catholic Church. The Black Mass is the direct opposite of the White Mass. The celebrant of the mass, who must have been a priest, is clad only in his sacrificial vestments, of which the chasuble may bear the figure of a goat, while the scarlet biretta is held by a woman dressed in scarlet who serves as deacon. Upon the altar is an inverted cross. Incense is used during the mass, but is mingled with some foul-smelling substance. The Black Credo, which is a blasphemous antithesis of the Apostles' Creed, is then recited.

The form of the sacrifice of the mass itself has changed since the seventeenth century. In the mediæval period and as late as the famous Black Masses performed by Abbé Guibourg on the persons of Mme. de Montespan and others, the altar

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was the reclining body of a nude woman, who held in her outstretched hands the lighted candles. The substances employed in the elements were numerous. Hosts which had been consecrated according to the rites of the Church, either by Satanist priests or by true priests from whom they were stolen by false communicants organized for this purpose, played an important part. Of the other components, at least in former times according to some authorities, the least objectionable were the wafers prepared from the ashes of one murdered child mixed with the blood of another. On the completion of the sacrilege of the Black Host follows the defiance of Christ and the exaltation of Satan, after which the Black Mass apparently becomes in some cases a mere orgy of licentiousness.

Satanism seems to be in great part a survival of the worship of demons, for it does not regard Satan as beneficent in any way, or as ill-treated, but as a fiend more powerful than the powers of good, who have been unable to keep the promises which they have made to the world. The Satanists thus stand in contrast to two classes of Devil-worshipers with whom they have certain points in common—the Ophites, on the one hand, a Gnostic sect who regarded Yahweh as evil, but the serpent, because of his gift of knowledge to the world (Gen. iii. 5), as the greatest benefactor and deity of mankind; and the Persian Yezidis, on the other, who believe that the Devil will be restored to heaven and that those who are kind to him in this time of his distress will be rewarded by him then, while those who are his enemies now will be punished by him in the future world. But, furthermore, it is clear that phallicism plays an important part in this cult, both from the goat and the prominence given to women in the ceremonies, as well as from numerous details of the Black Mass. A striking analogue may be drawn in this respect between Satanism and the *vāmācāryas*, or sectaries of the left-hand Tantra worship of India (see SAKTAS). Satanism may, therefore, be regarded in a very real sense as a survival of old pagan demon and fertility cults. This natural survival, however, became complicated by a revolt against the Catholic Church, probably about the twelfth century. This side of the cult soon became the more pronounced and now absorbs at a superficial glance all interest in the subject. It is, indeed, to this that Satanism probably owes its continued existence. The connection of Satanism with magic and sorcery is very close. Indeed, the practical object of the Black Mass is to prepare Black Hosts for magic purposes. Those resorting to this mass naturally gained the reputations of witches and wizards, especially in mediæval times when the ceremonies were often held at old Druidical dolmens, which already had superstitious associations. The entire idea of the witches' Sabbath, made famous, for instance, by Goethe's scene of the Walpurgis-Night in *Faust*, is based on this cult.

The history of Satanism is obscure. Attempts have been made to prove Gilles de Laval, Baron de Retz (1396-1440) (see BLUEBEARD), one of its first adherents, but even in its organized form it is probably much earlier. It existed pertinaciously with a recrudescence in the reign of Louis XIV., and is still practiced, especially in France, but probably in lessening degree. Its American stronghold is said by some to have been the ill-fated city of Saint Pierre in Martinique.

Consult: Michelet, *La sorcière* (Paris, 1890); Huysmans, *Là-bas* (ib., 1891); Bois, *Les petites religions de Paris* (ib., 1894); id., *Le satanisme et la magie* (ib., 1895); id., *Le monde invisible* (ib., 1902); Jaulmes, *Le satanisme et la superstition au moyen âge* (Montauban, 1900). See also DEMONOLOGY; MAGIC; OPHITES; PHALLICISM; WITCHCRAFT; YEZIDIS.

SATANSTOE. A novel by James Fenimore Cooper (1845). It is a tale of colonial life in New York. The title is the name of a neck in Westchester County, near Hell Gate.

SATAN'TA (Kiowa *Set-t'aiñ-ti*, White Bear) (?-1878). A prominent Kiowa chief distinguished alike for his prowess on the warpath and for his eloquence, which gained for him the title of the 'Orator of the Plains.' He was considered next in authority to the elder Lone Wolf (q.v.). He was already acknowledged as a chief in 1864, and first came into official prominence as one of the signers of the Medicine Lodge treaty of 1867, by which his people agreed to come in upon a reservation. For an attack upon a wagon train in Texas in 1871, in which seven white men were killed, Satanta and two other chiefs were arrested, tried for murder, and sentenced to life imprisonment in the Texas penitentiary. Here he committed suicide by throwing himself from an upper story of the hospital.

ŚATAPATHA-BRĀHMAṆA, shä'tà-pät'hà-bräk'mà-nà (Skt., Brahmanical treatise of the hundred paths). The title of a well-known Sanskrit work connected with the White Yajur-Veda. See BRAHMANA; SANSKRIT LITERATURE; VEDA.

SATELLITES (OF., Fr. *satellite*, from Lat. *satelles*, attendant). Certain celestial bodies which revolve round some of the planets, as these latter revolve round the sun. Astronomers sometimes apply to them the generic term 'secondary planets.' The earth, Mars, Jupiter, Saturn, Uranus, and Neptune (qq.v.) each possesses one or more of these attendants. The motion of all the satellites with the exception of those of Uranus and Neptune is direct, i.e. from west to east. The satellites of Uranus and Neptune, whose planes of revolution are nearly perpendicular to the ecliptic, have a retrograde motion, i.e. revolve from east to west. The eclipses, inequalities, inclinations, and reciprocal attractions of the satellites have been carefully noted from time to time, and the theory of their motions, at least of the most prominent of them, has been found to coincide with that of the moon. See MOON.

SATIN (OF., Fr. *satin*, OIt. *setino*, from ML. *setinus*, satin, silken, from *seta*, silk, from Lat. *sēta, sæta*, bristle, stiff hair). A fabric or form of weave in which so much of the filling is brought uppermost in the weaving as to give a more lustrous and unbroken surface to the cloth than is seen when the warp and filling cross each other more frequently. The term satin is very rarely applied to any other than silk fabrics, but there are woolen, linen, and cotton satins known in the markets, which are usually called *sateens*. See WEAVING for full explanation of satin and other weaves.

SATINWOOD. A beautiful ornamental wood obtained from both the West and East Indies.

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The former is the better kind, and is supposed to be the product of a moderate-sized tree, Parinarium Guianensis, and probably other species. That from the East Indies is less white in color, and is produced by Chloroxylon Sweitenia. Both are much used by cabinet-makers and for marquetry, etc. In Florida a kind of satinwood is produced by Zanthoxylum cribrosum. It is found in the Keys of Florida and Santo Domingo, Porto Rico, and Bermuda.

SATIRE (Lat. *satira, satura,* medley, from *satur,* full, from *sat,* enough). The name given by the Romans to a species of poetry, of which they claimed to be the inventors. According to grammarians, the complete term was *satura lanx,* from which *lanx,* meaning 'a plate,' dropped away. Among the Greeks the satire was called *sillos,* meaning 'squint-eyed.' A certain number of these *silloi,* in elegiac verse, were composed by Xenophanes (d. about B.C. 500), who burlesqued Homer and Hesiod. Some fragments, too, have survived of the *silloi,* in hexameter verse, of Timon of Phlius (d. B.C. 268), who waged war on the philosophers. In the comedies of Aristophanes satire assumed wide scope. And yet for Western Europe, satire dates only from Latin literature. The oldest Roman satires were medleys of scenic or dramatic improvisations expressed in varying metres (Livy, vii., 2), like the Fescennine verses (q.v.), but the sharp banter and rude jocularity of these unwritten effusions bore little resemblance, either in form or spirit, to the earnest and acrimonious criticism that formed the essential character of the later satire. The earliest—so far as we know—who wrote *saturæ* were Ennius and Pacuvius; but the metrical miscellanies of these authors seem to have been little more than serious and prosaic descriptions, or didactic homilies and dialogues. Lucilius (d. B.C. 103) is universally admitted to be the first who handled men and manners in that peculiar style which has ever since been recognized as distinctly satirical and an effective weapon for personal attack. After the death of Lucilius, satire, as well as other forms of literature, languished; nor do we meet with any satirist of note till the age of Horace, whose verse, though sharp at times, is in the main humorous and playful. Persius (q.v.) resembles Horace in many ways, but is fundamentally more serious and sincere. It is different with Juvenal, somewhat later, for whom satire became a *sæva indignatio,* a savage onslaught on the open vice of the capital. After Juvenal we have no professed satirist, but of several writers in whom the same element is found, Martial, the epigrammatist, is perhaps the most notable.

During the Middle Ages the satirical spirit showed itself abundantly in the general literature of France, Italy, Germany, England, and Scotland. Men who have a claim to the character of satirists, *par excellence,* are Ulrich von Hutten, one of the authors of the *Epistolæ Obscurorum Virorum,* Erasmus, Rabelais, William Langland, Skelton, Sir David Lindsay, and George Buchanan. Among the Elizabethans were Nash, Marston, Bishop Hall, and Donne. In France, satire as a formal literary imitation of antiquity appeared early. Setting aside the Fabliaux, Rutebeuf, Jean de Meung, and other mediæval writers, Vauquelin may be considered one of the founders of modern French satire. The satirical verses of Mottin, of Sigogne, and of Berthelot, of Mathurin Regnier, *L'Espadon satirique* of Fouqueraux, and *Le Parnasse satirique,* attributed to Théophile Viaud, are foul in expression, and remind us that at this time a satire was understood to be an obscene work—the seventeenth-century scholars supposing that the name had something to do with Satyr, and that the style ought to conform to what might be thought appropriate to the etymology. During the seventeenth and eighteenth centuries both England and France produced professed satirists, who have not been surpassed by the best either of their forerunners or their followers. The names of Butler, Dryden, Pope, and Churchill in England, of Boileau and Voltaire in France, are among the greatest. Edward Young and Dr. Johnson were also distinguished satirists. It may be noticed, however, as a distinguishing characteristic of Dryden, Boileau, Young, Pope, Churchill, and Johnson, and as a mark of the difference of the times in which they lived, that it is no longer the Church that is assailed, but society, political opponents, literary rivals, etc. Swift, Arbuthnot, and Junius were the great prose satirists of their time.

Satire in the shape of political squibs and lampoons, is abundant in the seventeenth and eighteenth centuries. Butler's *Hudibras* is one long caricature of the Puritans; most of the playwrights of the Restoration were royalist satirists—unscrupulous and indecent partisans. Dryden himself was but *facile princeps* in the company. Andrew Marvel is the most famous name on the side of liberty. The *Beggars' Opera* of the poet Gay is a very fine bit of political satire. Gifford and Wolcot, better known as Peter Pindar, also deserve mention in an historical view, though their intrinsic merits are small. Incomparably superior to all their contemporaries and among the first order of satirists were Burns and Cowper. Meanwhile in France, since Voltaire, no great name had appeared, except, perhaps, that of Béranger. In Germany the most conspicuous modern names are those of Rabener, Hagedorn, Kästner, Lichtenberg, Stolberg, Wieland, Tieck, Jean Paul, Platen, and, notably, Heine; but none of these adhered strictly to the classic models. Of nineteenth-century satirists in England the best are Byron, James and Horace Smith, Hunt, Hood, and Browning, in poetry, and Hook, Jerrold, Thackeray, Disraeli, and Carlyle in prose. The United States are excellently represented by Irving, Lowell, Holmes, Artemus Ward, and Mark Twain. Recent brilliant examples of the lighter satire are the 'Dooley' papers contributed by F. P. Dunne to various American and English journals, and Ashby-Sterry's 'Bystanders'. Consult Nettleship, *The Roman Satura* (Oxford, 1878); Keller, *Satur* (Kiel, 1888); Hannay, *Satire and Satirists* (London, 1854). See the authors and the literature mentioned in this article; also BURLESQUE; CARICATURE; FABLIAUX; PARODY.

SATIRE MÉNIPPÉE, sȧ'têr' mȧ'nê'pȧ'. See MÉNIPPÉE.

SATIROMASTIX (from Lat. *satira,* satire + Gk. μάστιξ, *mastix,* scourge). A comedy by Thomas Dekker (1602) in which Ben Jonson figures as Horace, junior. It is a good-humored retort to Jonson's *Poetaster.*

SATISFACTION. See ACCORD AND SATISFACTION.

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SAT'LEJ. A river of India. See SUTLEJ.

SATOLLI, sä-tōl'lē, FRANCESCO (1831—). An Italian cardinal, born at Perugia, where he pursued his studies at the Diocesan Seminary. Pope Leo XIII. appointed Satolli to a professorship in the Roman Seminary and School of the Propaganda. In 1888 Satolli was made titular Archbishop of Lepanto. Later, when new questions came to the Church in the United States, Mgr. Satolli was sent out as Papal Ablegate with plenary power (November, 1892), which was confirmed by his appointment in January, 1893, as Apostolic Delegate to the American Church, with an official residence in Washington. Mgr. Satolli has written several valuable works, among them a commentary on Saint Thomas Aquinas, and a *Course in Philosophy*, much used in Catholic institutions of learning. He was elevated to the cardinalate in 1895, and was recalled and succeeded by Archbishop Sebastiano Martinelli in 1896.

SÁTORALJA-UJHELY, shä'tō-rŏ-lyŏ ōō'y'-hĕl-y'. The capital of the County of Zemplin, Hungary, 105 miles northeast of Budapest (Map: Hungary, G 2). It is picturesquely situated at the base of the Hegyalja, one of the offshoots of the Carpathians. It has a Piarist gymnasium and is noted for its wine and tobacco. Population, in 1900, 16,712.

SATOW, sät'ō, Sir ERNEST MASON (1843—). A British diplomatist and scholar, born in London. After graduation at University College, London, he entered the British civil service. In the consular service in Japan he rose to be Japanese secretary to the British Legation; received the decoration of Saint Michael and Saint George; was transferred to Siam as consul-general in 1883, and became Minister there in 1885. In 1888 he became Minister Resident at Montevideo, and in 1893 was sent to Morocco as Envoy Extraordinary and Minister Plenipotentiary, and two years later to Japan, whence in the autumn of 1900, after the Boxer uprising, he was transferred to Peking, where he took a prominent position in the settlement of the indemnity and other questions. With Hawes he edited the first and second editions of *Murray's Hand Book for Japan* (1882), and with Ishibashi, an *English-Japanese Dictionary* (1876). He wrote the *Jesuit Mission Press in Japan, 1591-1610* (1888), and many papers of great learning and of the highest value in the *Transactions of the Asiatic Society of Japan*, particularly in connection with Shinto (q.v.).

SATSUMA, sät'sōō-mä, or SASSHIU. A province of Japan, occupying the southern portion of the island of Kiushiu, and now included in the Prefecture of Kagoshima (q.v.). It was long held as a fief of the princely House of Shimadzu, has produced a large number of able men, and has always played a very important part in the history of the country. The clan had a leading place in the revolution of 1868. Its statesmen have preponderated in the national council for many years. The province is noted for its faïence. It was at Kagoshima, the chief town of the province, that Francis Xavier landed in 1549 to begin his missionary labors. For the Satsuma Rebellion, see SAIGO.

SAT'TERLEE, HENRY YATES (1843—). An American bishop of the Episcopal Church. He was born in New York City, and received his degree from Columbia College in 1863. In 1866 he completed the course of the General Theological Seminary, and was ordained priest. He became attached to Zion parish, Wappinger's Falls, N. Y., as assistant in 1865, and in 1875 was made rector. In 1882 he removed to New York City and became rector of Calvary Church, a post he retained for fourteen years. In 1896 he was consecrated first Bishop of Washington, D. C. His principal published work is *A Creedless Gospel and the Gospel Creed* (1894), a book inspired by the Parliament of Religions held in Chicago in 1893.

SATTERLEE, WALTER (1844—). An American painter and illustrator, born in Brooklyn, N. Y. He graduated at Columbia College in 1863, studied at the Academy of Design, and afterwards under Edwin White and (1878-79) under Léon Bonnat in Paris. He became an associate of the National Academy in 1879, and in 1886 took the Clarke Prize. His paintings include "The Runaways," "The Old Garden," "The Feast of Flora," "An Old Time Coquette," and "Old Ballads."

SATURATION (Lat. *saturatio*, from *saturare*, to fill, saturate, from *satur*, full; connected with *sat*, *satis*, enough). A term in psychology signifying purity of color sensation, that is, relative deficiency of black or white admixture. Together with color-tone and brightness, saturation, which may be regarded as the color intensity of a given color, determines the total color impression. A saturated color tone, which is obtained only by spectrum analysis, is free from all mixtures of other color-tones. The external stimulus producing a pure color sensation, or saturation, is a light vibration of single wave-length. Light vibrations of many wave-lengths produce such compound color sensations as yellowish white, reddish white, etc. One of all wave-lengths of the optical spectrum produces a zero saturation, that is, white.

SATURDAY REVIEW, THE. A London weekly review of politics, literature, science, and art, founded in 1855 by John Douglas Cook, under whose editorship it maintained a high rank in its class. In 1898, Harold Hodge, well-known for his interest in London social questions, became the editor.

SATURN (Lat. *Saturnus*, OLat. *Sateurnus*, *Sæturnus*; connected with *sator*, sower, *serere*, to sow, and ultimately with OChurch Slav. *sĕti*, Lith. *seti*, OHG. *sāen*, Ger. *sāen*, Goth. *saian*, AS. *sāwan*, Eng. *sow*). An ancient Roman divinity who presided over the sowing of the seed. His festival occurred on December 17, after the conclusion of the winter sowing. (See SATURNALIA.) A temple was built in B.C. 497 (according to the story) at the foot of the Capitol, and became later the place of deposit for the State's treasury. Early, however, the identification with the Greek Cronos arose, and the offerings to Saturn were made according to the Greek rite. Probably in consequence of this identification arose the legend that Saturn was an ancient king of Latium, under whose gracious rule the whole of Italy had enjoyed a golden age. In the Greek myth Cronus (Κρόνος) appears as the eldest of the Titans (q.v.), son of Uranus and Gæa. He mutilated his father and became the ruler of the universe. To guard against danger of an overthrow, he swallowed his children by Rhea as fast as they were born. At last, after the birth

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of Zeus, she tricked him into swallowing a stone wrapped in swaddling clothes. Zeus, as he grew up, persuaded his father to disgorge his elder children, and presently began the war against the forceful rule of the Titans that he might establish a reign of law. After a fierce conflict Cronus was cast into Tartarus. Later poets represent him as afterwards released and ruling in happiness over the Isles of the Blessed. Cronus seems to owe much of his existence to the desire of explaining the race of Zeus and his position of supreme power. Only at Athens and Olympia were there special shrines and offerings to him, and a festival in his honor, the Cronia. In representations of Cronus his head was usually covered with a mantle, and in his hand was the curved scimiter or knife, *harpe*, or sickle.

SATURN. The sixth of the planets in order of distance from the sun and the second in size. Its distance from the sun varies between 861 and 911 millions of miles; period of revolution, about 20 solar years; axial rotation period, about 10 hours 14 minutes; the apparent angular diameter of the disk, between 14 seconds and 20 seconds; diameter, 73,000 miles; volume, 760 times that of the earth; mass, 75 times the earth's. Therefore Saturn's density is only one-eighth that of the earth, or not much more than one-half that of water. The inclination of the axis to Saturn's orbit is about 27°. This planet is in many respects the most interesting of all. The first glance at it with a telescope always gives one a feeling of astonishment. The bright ball of the planet is set in the centre of a luminous oval ring, and surrounded by at least eight moons; truly a planetary system of extreme complexity and of surpassing beauty. The ring system was discovered by Galileo in 1610, just after the invention of the telescope, but he did not explain correctly what he saw. He thought the planet's ball had two appendages or *ansæ*, and announced that it was triple. Huggins, in 1655, gave the correct explanation of the visible phenomena, and showed that the planet must be surrounded by a ring. The ring system is round, but appears oval as a result of foreshortening, since the plane of the ring is not square to our line of vision. Indeed, at times the ring plane may pass through the earth, and then we see the ring edgewise, which makes it appear simply as a thin bright line. At other times the ring disappears altogether, in consequence of its plane passing between the earth and the sun. When this occurs, only the side of the ring toward the sun is illuminated. Modern observers have found the ring to be in reality triple, consisting of concentric parts. Mathematical researches have shown that its durability would be impaired if it were solid. If such were the case, any temporary disturbance or perturbation would suffice to disrupt it, and the fragments would be precipitated on the planet. Nor can the ring be liquid. The only remaining conclusion is that it is composed of a very large number of small satellites, analogous to the ring of small planetoids (q.v.) surrounding our sun, and lying between the orbits of Mars and Jupiter. This theory of the rings has received strong confirmatory evidence from spectroscopic observations made in 1895 by Keeler. See PLANETS.

SATELLITES. Saturn has at least eight satellites. A ninth was discovered photographically in 1899 at the Arequipa (Peru) station of the Harvard University observatory; but this discovery still lacks confirmation. Their elements are given in the following table:

NAME	Discoverer	Date of discovery	Sidereal revolution	Greatest distance from Saturn in term of its equatorial radius	Mass, that of Saturn being 1
Mimas	W. Herschel	July 18, 1789	0 d. 22 h. 37 m.	3.07	0.00000007
Engelade	W. Herschel	Aug. 29, 1789	1 d. 8 h. 53 m.	3.94	0.00000025
Tethys	J. D. Cassini	Mar. 21, 1684	1 d. 21 h. 18 m.	4.87	0.00000110
Dione	J. D. Cassini	Mar. 21, 1684	2 d. 17 h. 41 m.	6.25	0.00000187
Rhea	J. D. Cassini	Dec. 23, 1672	4 d. 12 h. 25 m.	8.73	0.00000400
Titan	Huygens	Mar. 25, 1655	15 d. 22 h. 41 m.	20.22	0.00021277
Hyperion	G. P. Bond	Sept. 16, 1848	21 d. 6 h. 39 m.	24.49	.....
Japetus	J. D. Cassini	Oct. 25, 1671	79 d. 7 h. 56 m.	58.91	.....

SATURN, TEMPLE OF. A temple in the Roman Forum, consecrated in B.C. 491 by the Consuls Sempronius and Minucius, and restored about B.C. 44 by Munatius Plancus. It stood at the foot of the Clivus Capitolinus, where eight of its marble columns on a substructure 16 feet in height still form one of the conspicuous monuments of the Forum. The temple was from very early times not only a place of worship, but also a public treasury. It was the only temple in Rome which might be entered with uncovered head, and the first to use wax tapers.

SATURNALIA (Lat. nom. pl., relating to Saturn, from *Saturnus*, Saturn). An ancient Roman festival celebrated in honor of Saturn (q.v.). The festival began on December 17th, and the public religious rites were confined to that day. The festivities, however, lasted during the later Republic for seven days, and Augustus made the holiday cover three days, which his successors extended to five. That this was originally an agricultural festival, connected with the end of late sowing, and also the turning of the year at the winter solstice, there can be little doubt; but the whole ritual has been so transformed by the Hellenizing of Saturn and his worship that the original elements can scarcely be discerned. The change is connected with the lectisternium at the Temple of Saturn in B.C. 217, when a public banquet was held and this new celebration of the Saturnalia enjoined in perpetuity. The sacrifices were offered with uncovered head, i.e. in the Greek fashion, and the public feast is certainly Greek. At the sacrifice the senators and knights wore the toga, but this was laid aside for the banquet. After the banquet the populace roamed through the city, shouting *Io Saturnalia*. The next day the usual bath was taken very early, as there was no time later. A family sacrifice, of a young pig, followed, and the rest of the day and the following days were given up to the exchange of calls, pres-

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ents, and banquets, at which a king was chosen whom all must obey. Favorite presents were wax tapers and little clay or pastry images (the sigillaria). In fact, we are told that the days following the 17th, on which these figures were sold, were called the Sigillaria. During this period the courts and schools were closed, and military operations were suspended that the army might celebrate. A special feature of the Saturnalia was the freedom given to the slaves, who even had first place at the family tables and were served by their masters. Later speculation interpreted this as a reminiscence of the Golden Age under King Saturnus. On December 15th occurred the *Conseralia*, and on December 19th the *Opalia*, in honor of Consus and Ops, both of whom seem to have been deities connected with the storing of the grain. Later legend identified Ops with the Greek Rhea, and made her the wife of Saturn, though it is quite possible that originally she was more closely connected with Consus.

SATURNIAN VERSE (Lat. *Saturnius*, relating to Saturn, from *Saturnus*, Saturn). The name given by the Romans to that species of verse in which their oldest poetry was composed. In the usage of the later poets and grammarians the phrase is applied in a general way to denote the rude and unfixed measures of the ancient Latin ballad and song, and is not intended to determine the character of the metre, and it is also applied to the measure used by Nævius, which has been held by many scholars to be an importation from Greece. Saturnian verse continued in use down to the time of Ennius (q.v.), who introduced the hexameter (q.v.). According to Hermann, the basis of the verse is contained in the following *schema:*

⏑ ´ ⏑ — ⏑ ´ ⏑ | ´ ⏑ — ⏑ ´ ⏑,

which, as Macaulay happily points out, corresponds exactly to the nursery rhyme.

The quéen was in the párlor | éating bréad and hóney.

In the treatment of it a wide and arbitrary freedom was taken by the old Roman poets, as is proved by the still extant fragments of Nævius, Livius Andronicus, Ennius, and of the early epitaphs and inscriptions. Consult: Mommsen, *History of Rome*, i., chap. xv.; Teuffel-Schwabe-Warr, *History of Roman Literature* (London, 1891). The slight remains of Saturnian verse will be found in Ritschl, *Saturniæ Poeseos Reliquiæ* (Bonn, 1854), and the inscriptions only in Buecheler, *Anthologia Latina* (Leipzig, 1895).

SAT'URNI'NUS, Lucius Apuleius (?-B.C. 100). A Roman demagogue, tribune of the people in B.C. 102 and 100. He procured his reëlection by the help of Marius and Glaucia, as well as by the murder of his opponent. To this violence and to the alliance with the popular party it is supposed Saturninus was led because of his removal by the senate from the post of quæstor at Ostia. In the first year of his tribunate he had introduced a law of *majestas*, by which the old right of trial under the charge of *perduellio* by a board of two, with right of appeal to the *comitia*, was superseded. In his success Saturninus overstepped the mark by his grain laws, which almost gave away the public corn. He caused the murder of Memmius, who contested Glaucia's reëlection. The popular uprising drove him and Glaucia to the Capitol. They surrendered to Marius, but were killed in the Curia, where Marius had put them for safe-keeping.

SATYR (Lat. *Satyrus*, from Gk. Σάτυρος, Satyros). In Greek mythology, one of the deities or spirits of the woods and hills, usually represented in early art with goat's ears, tails, and hoofs, often bearded and old, though in later times these bestial traits are much reduced, and scarcely extend beyond the pointed ears, and occasionally a small tail. In the fourth century B.C. we find the graceful youth, whose animal nature is scarcely indicated, while in Hellenistic times appears the different type of the rough peasant boy, whose features show plainly his vulgar and mischievous disposition. From Hesiod down they are constant figures in Greek literature as well as art, especially as companions of Dionysus. They appear as sensual pursuers and ravishers of the woodland nymphs, fond of wine, and also of the music of the woods, playing the syrinx, flute, and even the bagpipe. See Furtwängler, *Der Satyr aus Pergamon* (Berlin, 1880).

SATYR. A member of a subfamily (Satyrinæ) of medium-sized, usually brown or gray butterflies, the wings of which are very generally ornamented, especially on the under sides, by eye-like spots. About sixty species occur in the United States. They are weak fliers and most of them are forest-lovers, although some are found upon the Western prairies. The veins of the fore wings are greatly swollen at the base. The larvæ are cylindrical and are distinguished from other American butterflies, except those of the genus Chlorippe, by their bifurcated anal extremities. They are usually pale green or light brown, and feed upon grasses or sedges, remaining concealed during the day and emerging at dusk to feed. In the tropics the satyrs are often gaily colored. One very rare species (*Œncis semidiæ*) is remarkable on account of its distribution. It occurs in the United States only on the highest peaks of the White and Rocky Mountains, and is believed to have been a species of wide distribution in glacial times. When the ice broke up, the mass of the butterflies were exterminated by the encroaching heat, but a few individuals survived in the congenial coolness remaining on the peaks of the highest mountains.

SAUBA ANT (*Saüba*, South American Indian name). A neotropical leaf-cutting ant (*Œcodoma cephalotes*), which makes very remarkable underground mines. They excavate a series of tunnels and nests which extend through many square yards of earth, and are said to have tunneled under the bed of the River Parahyba at a spot where it was as broad as the Thames at London Bridge. H. W. Bates has shown that in the communities of this ant there are surely five castes—males, females, small ordinary workers, large workers with very large hairy heads, and large workers with large polished heads.

SAUGER, or Sand-Pike. A pike-perch (q.v.) of the Great Lakes and the Upper Mississippi tributaries, more elongated and cylindrical than the wall-eyed pike, with a distinct black blotch on the base of the pectoral fin. It is 10 to 18 inches long. This fish is also locally known as 'gray pike,' 'rattle-snake pike,' 'ground pike,' and 'hornfish.' See Plate of Perches of North America.

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SAUGERTIES, są'gĕr-tēz. A village in Ulster County, N. Y., 12 miles north of Kingston; on the Hudson River, and on the West Shore Railroad (Map: New York, F. 3). It is in a farming region, and has important stone quarries. Paper, blank books, brick, and cement are manufactured. There is a public library. The first settlers probably came as early as 1687, and in 1710 a colony of Palatines settled here. Until 1811, when the town was incorporated, Saugerties was part of Kingston. The village was incorporated in 1831. Population, in 1890, 4237; in 1900, 3697. Consult: Brink, *The Early History of Saugerties* (Kingston, N. Y., 1902).

SAUGOR'. A low swampy island of Bengal, India, at the mouth of the Hugli (Map: India, E 4). It is one of the holy places of the Hindu religion, noted formerly for its infant sacrifices. It is visited by multitudes of pilgrims in November and January at the time of the full moon, when, after the ceremony of purification, a great fair takes place. The island has an area of 225 square miles, chiefly covered with jungle, infested by tigers and other wild animals. Among its structures are a lighthouse, visible 15 miles, and meteorological stations. The population is not large, a cyclone and a tidal wave having devastated the island in 1864, sweeping away over two-thirds of the inhabitants.

SAUGUS, są'gŭs. A town, including three villages, in Essex County, Mass., 8 miles north of Boston; on the Saugus River and Massachusetts Bay, and on the Boston and Maine Railroad (Map: Massachusetts, F 3). It has a public library with more than 6000 volumes. Brick, spices, and woolen goods are manufactured. The government is administered by town meetings, convening annually. Saugus was incorporated in 1815. Population, in 1890, 3673; in 1900, 5084.

SAUK (from their own name, *Osagi*, of uncertain etymology, also known as Sac, and frequently referred to, in connection with their confederated tribe, under the compound title of Sacs and Foxes). A prominent and warlike tribe of Algonquian stock (q.v.), formerly holding both banks of the Mississippi and the entire Rock River region in northwestern Illinois, eastern Iowa, and southwestern Wisconsin, with a portion of Missouri. According to tradition they once lived on the Ottawa River, Canada, but, with other tribes, were driven out by the attacks of the Iroquois. About 1670 they were found by the French in northern Wisconsin, in immediate vicinity of their close kindred, the Muskwaki or Foxes. From this position the two tribes were gradually pressed southward by the Ojibwa. The Foxes suffered severely in a war with the French, and in a great battle with the Ojibwa about 1760 were so greatly reduced that they were forced to confederate with the Sauk, who retained the leading position. On the conquest of the Illinois about 1765 the Sauk took possession of the Rock River country of Illinois and the adjacent territory in Iowa. In 1832 a considerable party, led by Black Hawk (q.v.), combined to resist the execution of a treaty by which the Indians were to give up all their lands east of the Mississippi, but in the short war they were defeated. The Indians were removed to the west side of the Mississippi, in Iowa, and subsequently, in different bodies, to Kansas and the Indian Territory. A part of those who removed to Kansas, chiefly of the Muskwaki or Fox tribe, afterwards returned to Iowa and repurchased lands near Tama. In 1903 the Sauk and Muskwaki numbered together about 930. As a people they are strongly conservative.

SAUL (Heb. *shāūl*, asked [of Yahweh], or devoted [to Yahweh], pass. part. of *shāal*, to ask). The first King of Israel, the beginning of whose reign is placed at about B.C. 1050. He was a son of Kish, of the tribe of Benjamin. The account of his career, embodied in I. Sam. ix. to II. Sam. i., represents a combination of the two chief sources believed by modern critics to be found in the books of Samuel (q.v.). As a consequence it is asserted that we have two varying accounts of the manner in which he came to occupy his position as head of the people. According to one of these accounts, it was while searching for the lost asses belonging to his father that he encountered the seer Samuel, who announced to Saul that he was destined to deliver Israel from the oppression of the Ammonites and Philistines. Soon afterwards Nahash, a chief of the Ammonites, laid siege to Jabesh-Gilead. The inhabitants appealed to the West-Jordan tribes for aid, and when the news reached Saul he gathered a force with which he inflicted a crushing defeat on Nahash. At Samuel's bidding the people then gathered at Gilgal and solemnly crowned Saul as King. The other account represents the people as dissatisfied with their condition and demanding of Samuel that a king be placed at their head. Samuel, while rebuking the people, nevertheless yields to the popular request and at an assembly held at Mizpah Saul is chosen.

Those who accept the above theory conclude from these varying accounts that it was not so much Samuel's interference as the natural course of events that brought Saul forward. The chief efforts of his career were directed toward reducing the power of the Philistines. In a series of well-directed campaigns he drove the Philistines back to their territory along the seacoast. He was equally successful in his campaign against the Amalekites. His victory over them represents the climax in his career. Intertribal jealousies and family intrigues loosened the union of the tribes after the crisis had been temporarily passed, while the growing popularity of the youthful David (q.v.), originally introduced at Saul's court as a skillful harp-player, brought out the worst elements in Saul's nature. A strange melancholy settled upon him, and this illness, which at times resembled madness, was a factor leading to the quarrel between Saul and David; and while David was obliged to take flight, he did more harm to Saul's cause by alliances with the enemies of Israel than he could possibly have done had he remained in Saul's service. Encouraged by this state of affairs, the Philistines roused themselves to renewed action, and at Mount Gilboa succeeded in defeating the Hebrew army. Saul's three sons perished in the battle, while the King himself, when he realized the desperateness of the situation, "fell on his sword" and thus put an end to his life. Consult: the chapters on Saul in the Hebrew histories of Stade, vol. i. (Giessen, 1881), Guthe (Freiburg, 1899), Renan (Paris, 1887), Piepenbring (ib., 1899), Kent (New York, 1891), and Wellhausen (Berlin, 1895). See DAVID.

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SAUL. (1) An oratorio by Handel (q.v.). (2) A poem by Robert Browning (q.v.).

SAULCY, sô'sē', LOUIS FÉLICIEN JOSEPH CAIGNART DE (1807-80). An Oriental numismatist and antiquary. He was born at Lille, studied at the Ecole Polytechnique, in 1838 became professor of mechanics at Metz, and was later appointed conservator of the museum of artillery at Paris. His activity was mainly devoted to numismatics and archæology. In 1842 he became a member of the French Academy. Among his publications may be mentioned *Essai de classification des suites monétaires byzantines* (1836); *Recherches sur la numismatique punique* (1843); *Recherches sur la numismatique judaïque* (1854); *Voyage en Terre-Sainte* (1865); *Sept siècles de l'histoire judaïque* (1874); and *Histoire des Machabées* (1880).

SAULT SAINTE MARIE, sōō sānt mā'rē, *Fr. pron.* sô sănt mà'rē'. A port of entry of Algoma District, Ontario, Canada, opposite its Michigan namesake, on the Saint Mary's River and the Saint Mary's Falls ship-canal (Map: Ontario, N 9). A railway bridge, one mile long, spans the river between the two towns and connects the Northern Pacific Railroad with the Canadian Pacific Railway by the Sault or "Soo" branch line. The town has agricultural, mining, manufacturing, and shipping interests. It owns its water-works and electric lighting plant. Population, in 1891, 2414; in 1901, 7169.

SAULT SAINTE MARIE. The county-seat of Chippewa County, Michigan, 350 miles west-northwest of Detroit; on the Saint Mary's River, and on the Canadian Pacific, the Duluth, South Shore and Atlantic, and the Minneapolis, Saint Paul and Sault Ste. Marie railroads (Map: Michigan, J 2). The ship canal here, connecting Lakes Superior and Huron, is noted for its extensive freight traffic. New locks have been constructed from time to time by the Federal Government to meet the demands of the constantly increasing commerce. The last of these, costing about $4,000,000, was opened in 1896. It is 800 feet long and 100 feet wide, and will admit vessels drawing 21 feet of water. (For illustration, see CANAL.) Other noteworthy features are the International Bridge across the rapids of the Saint Mary's River, a public library, Fort Brady, and Canal Park. The water power afforded by the rapids near the city generates electrical energy equivalent to 100,000 horse power. The power is utilized by several important industries. There are lumber mills, paper mills, a carbide manufactory, dredging machinery works, flour and woolen mills, and fish-packing establishments. The government, under the revised charter of 1897, is vested in a mayor, elected biennially, and a unicameral council. In 1641 the Jesuit Fathers Raymbault and Jogues established a mission here, but it was soon abandoned. In 1662 Father Marquette founded here the first permanent settlement within the present limits of Michigan. At this place in 1671 the French convoked a great congress of the Indian nations. Sault Sainte Marie was first incorporated in 1887. Population, in 1890, 5760; in 1900, 10,538.

SAUMAREZ, sô'mà'rà', JAMES, Baron de (1757-1836). A British admiral. He was born in the Isle of Guernsey and entered the British navy in 1770. He distinguished himself during the attack on Charleston in 1776, and was under Sir Hyde Parker in the action of the Dogger Bank in 1781. In 1782, as commander of the *Russell*, he shared Rodney's victory over De Grasse. After living some years on shore, he made a gallant capture of the French frigate *La Réunion* in 1793. He fought in the battles of l'Orient (1795), Saint Vincent (1797), and the Nile (1798). He became Rear-Admiral of the Blue in 1801, and in the same year gained a splendid victory over the French and Spanish off Cadiz (July 12). He subsequently commanded the Baltic fleet for a number of years. He became admiral in 1814, vice-admiral of Great Britain in 1821, and was raised to the peerage in 1831.

SAUMUR, sô'mur'. The capital of an arrondissement in the Department of Maine-et-Loire, France, 28 miles southeast of Angers (Map: France, F 4). It is dominated by a castle-crowned hill and is built partly on the left bank of the Loire and partly on an island. The school for cavalry, founded here in 1768, occupies a magnificent building, and has extensive parade grounds. Other prominent features include the Church of Saint Pierre, dating from the twelfth century, the pilgrimage Church of Notre Dame de Nantilly the sixteenth-century town hall, the pilgrimage Church of Notre Dame College, and the Museum of Science and Archæology. The town is noted for its wines and manufactures enameled goods. Saumur was one of the leading centres of Protestantism in France, but lost half of its population and its commercial prestige by the revocation of the Edict of Nantes. Population, in 1901, 16,233.

SAUN'DERS, FREDERICK (1807-1902). An American librarian and author, born in London, England. He came to New York (1837), engaged in publishing, and was a pioneer in the agitation for international copyright. For some time he was city editor of the *Evening Post*. In 1859 he became assistant librarian of the Astor Library, and head librarian in 1876, resigning in 1896. Among many volumes, chiefly of ephemeral interest, the more noteworthy were: *Salad for the Solitary by an Epicure* (1853); *Salad for the Social* (1856), both frequently reprinted; *Evenings with the Sacred Poets* (1869); *Pastime Papers* (1885); and *Story of Some Famous Books* (1887). He edited, with H. T. Tuckerman, *Homes of American Authors* (1853).

SAUNDERS, RICHARD. The name used by Benjamin Franklin for the supposed author of *Poor Richard's Almanac*.

SAUNDERS, THOMAS BAILEY (1860—). An English author, born in Alice, Cape Colony, and educated at King's College, London, and at University College, Oxford. He translated Schopenhauer's essays under the titles *The Wisdom of Life*, *Studies in Pessimism*, *The Art of Literature*, and *On Human Nature* (1889-96); maxims and reflections from Goethe (1893); and Harnack's *Christianity and History* (1896), *Thoughts on Protestantism* (1899), and *What is Christianity* (1900); and wrote *Schopenhauer* (1901), and *Professor Harnack and His Oxford Critics* (1902).

SAUN'DERSON, or **SANDERSON,** NICHOLAS (1682-1739). An English mathematician, born at Thurlston, near Penniston, in Yorkshire. When only one year of age he lost his sight from smallpox. In spite of this infirmity,

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he became proficient in the classics and in mathematics. At the age of 25 he was taken to Christ's College, Cambridge, where he had hoped to be admitted. Lack of means, however, barred him from becoming a student there, but by the consent of Whiston, then Lucasian professor, he was allowed to lecture on mathematical physics. On Whiston's expulsion from his professorship, Saunderson was considered for the place, and finally, by special royal patent, was made M.A. (1711) and installed in it. He was a fellow of the Royal Society (1719). Saunderson was an indefatigable teacher. His *Algebra*, written during his later years, was published soon after his death (2 vols., 1740-41). A few years later some of his manuscripts were published under the title, *The Method of Fluxions*, etc. (1751), and an abridged edition of his *Algebra* appeared (1761). For his biography, consult the preface to his *Algebra* (Cambridge, 1740-41).

SAUPPE, zoup'pe, HERMANN (1809-93). A German classical scholar, born at Wesenstein, near Dresden. After studying at Leipzig, he was professor extraordinary at the University of Zurich in 1838-45; director of the Gymnasium at Weimar in 1845-56, and finally professor of philology at the University of Göttingen, where he remained until his death. Sauppe won his greatest fame by his researches in the field of Greek oratory. Among his works on this subject are editions of the *Oratores Attici* (9 vols., with Baiter, 1839-50); selected orations of Demosthenes (1845); and the *Epistola Critica ad Godofredum Hermannum* (1842), considered one of the most valuable modern treatises on the methodology of textual criticism. His other works included editions of Philodemy's *De Vitiis*, liber x. (1853); Plato's *Protagoras* (1857, 4th ed. 1854), which appeared in a well-known *Sammlung griechischer und lateinischer Schriftsteller mit Anmerkungen*, founded by Sauppe and Haupt, in 1848; and *Eugippii Vita S. Severini* (published in the *Monumenta Germania Historica*). His library was bought by Bryn Mawr College.

SAUREL. A small active carangid marine fish of the genus Trachurus. One species (*Trachurus saurus*) is mainly South-European, and is known to the English as horse-mackerel; another (*Trachurus symmetricus*) is the 'horse-mackerel' of California. These fishes share the names 'jurel' and 'gascon' with related genera. See Plate of HORSE MACKEREL.

SAURET, sô'râ', EMILE (1852—). A French violinist, born at Dun-le-Roi, Cher. He studied at the Paris Conservatory and was a pupil of Bériot at Brussels. From 1880 to 1881 he was teacher at Kullak's Akademie in Berlin, and, in 1890, was appointed professor of the violin at the London Royal Academy of Music to succeed Sainton. Among his works are: *Gradus ad Parnassum du violoniste* (1894); 2 violin concertos; about 130 other pieces for the violin, with or without the orchestra; 20 grandes études; 12 études artistiques; and about 25 transcriptions.

SAURIA (Neo-Lat. nom. pl., from Gk. σαῦρος, *sauros*, lizard). A subclass of the Reptilia, including the Autosauri or Lacertilia (lizards), and the Ophidia (snakes), defined by Gadow as reptiles with movable quadrate bones, with a transverse external cloacal opening, near the posterior lateral corners of which open the reversible paired copulatory organs. See REPTILE. Consult Gadow, *Amphibia and Reptiles* (London, 1901).

SAURIN, sô'răn', JACQUES (1677-1730). A celebrated French Protestant preacher. He was born at Nîmes, studied at Geneva, and was chosen minister of a Walloon church in London in 1701. In 1705 he settled at The Hague, where his extraordinary gift of pulpit oratory was much admired. As a preacher, Saurin has often been compared with Bossuet, whom he rivals in force, if not in grace and subtlety of religious sentiment. His discourses upon the more memorable events in the Bible were published at The Hague, 1728-39, and his sermons, 1748-65; an English translation of the latter appeared at London, 1824. Consult his *Life*, by Berthault (Paris, 1875).

SAUROP'SIDA (Neo-Lat. nom. pl., from Gk. σαῦρος, *sauros*, lizard + ὄψις, *opsis*, appearance). A division of Vertebrata, proposed by Huxley to include the birds and reptiles, which are closely related, as contrasted with the Ichthyopsida (fishes and amphibians), or with the Mammalia.

SAURY, or SAURY PIKE. See SKIPJACK.

SAUSAGE. See PACKING INDUSTRY.

SAUSAGE POISON. A disease, sometimes called BOTULISMUS, caused by eating diseased sausage or ham. In 1898 Van Ermengem discovered in unboiled ham, as well as in the spleen of persons who were poisoned by eating of it, a rod-shaped bacterium with spore formation at its end, which he termed *bacillus botulismus*. Filtered and germ-free solutions of this ham contained a toxin fatal to animals. See TRICHINIASIS.

SAUSSIER, sô'syâ', FÉLIX GUSTAVE (1828—). A French general, born at Troyes. He studied at Saint-Cyr and entered the army as lieutenant in 1850. He fought in Algeria, took part in the Crimean War, the Italian War of 1859, and the Mexican expedition, and in 1869 was made colonel. In the Franco-German War he distinguished himself at Colombey-Nouilly and Gravelotte. Taken prisoner at Metz in 1870, he escaped, returned to France by way of Austria and Italy, and joined the Army of the Loire. He was made a brigadier-general, and from 1871 to 1873 served against the Kabyles in Africa. In 1873 he was returned as Deputy for the Department of Aube, and in the National Assembly adhered to the Left Centre, taking an active share in all questions of military reform. In 1878 he became general of division, in 1881 was commander-in-chief of the army in Algeria and repressed a formidable uprising in Tunis, and in 1884 was appointed military governor at Paris. He retired in 1898.

SAUSSURE, sô'sụr', HORACE BÉNÉDICT DE (1740-99). A Swiss physicist and geologist born at Conches, near Geneva. When only twenty-two years of age he obtained the professorship of physics and natural philosophy at the University of Geneva. In 1768 he commenced the series of scientific journeys that have made him famous, during the course of which he traversed the Alps, the Jura, the Vosges, and the mountains of England, France, Germany, Italy, and other countries. The results of his extensive observations of the geological, botanical, and meteorological features of the mountainous region he visited were

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embodied in *Voyages dans les Alpes* (4 vols., 1779-96). His writings include: *Observations sur l'écorce des feuilles et des pétales* (1762); *De Præcipuis Errorum Nostrorum Causis, ex Mentis Facultatibus Oriundis* (1762); *De Electricitate* (1766); *De Aqua* (1771); and *Sur l'hygrométrie* (1783), the last named embodying the results of researches in regard to the properties of moisture-laden air.

SAUSSURE, NICOLAS THÉODORE DE (1767-1845). A Swiss botanist, son of Horace de Saussure, born in Geneva and educated there. He assisted his father in his physical researches and in his orographical studies, and made some valuable experiments as to atmospheric density. But his work on plant physiology, *Recherches chimiques sur la végétation* (1804), is his great claim to fame. He was the first to undertake a quantitative analysis of the nutriment of plants and urged the thesis that the vegetable organism is formed from carbonic acid abstracted from the air.

SAUTERNES, sô'târn'. A village in the Department of Gironde, France, 27 miles by rail southwest of Bordeaux. It is situated in the famous white-wine producing region of South-western France and gives its name to the best brands. Population, in 1901, 934.

SAV'AGE, JAMES (1784-1873). An American political leader and antiquary, born in Boston, Mass., and educated at Harvard. He was a member of the State Executive Council, of the Constitutional Convention of 1820, and at different times, of both branches of the Legislature. He founded and was successively secretary, treasurer, vice-president, and president of the Boston Provident Institution for Savings. Among his publications are editions of John Winthrop's *History of New England from 1630 to 1649* (1825-26 and 1853), and a valuable *Genealogical Dictionary of the First Settlers of New England* (1860-64). Consult Hilliard, *Memoir of the Hon. James Savage* (Boston, 1878).

SAVAGE, MINOT JUDSON (1841—). A Unitarian clergyman. He was born at Norridgewock, Me., entered Bowdoin College, but left before the end of his course, and pursued his theological studies at Bangor Seminary. Commissioned by the American Home Missionary Society in 1864, he spent the three following years at San Mateo and Grass Valley, Cal., then settled at Framingham, Mass., but removed to Hannibal, Mo., in 1869. While preaching in the latter place his views underwent so decided a change that he at length withdrew from the Congregational Church, and in 1873 became pastor of the Third Unitarian Church of Chicago. The next year he was called to the Church of the Unity in Boston and remained there until 1896, when he removed to New York and became minister at the Church of the Messiah, ranking among the advanced thinkers of his denomination. He has published *The Religion of Evolution* (1876); *Life Questions* (1879); *The Morals of Evolution* (1880); *Belief in God* (1881); *Beliefs About Man* (1882); *Beliefs About the Bible* (1883); *Man, Woman, and Child* (1884); *Social Problems* (1886); *My Creed* (1887); *Jesus and Modern Life* (1893); *Life Beyond Death* (1899); *The Passing and the Permanent in Religion* (1901).

SAVAGE, RICHARD (?-1743). An English poet, who was, according to the current legend, an illegitimate son of Richard Savage, Lord Rivers, by the Countess of Macclesfield. The Countess, while living apart from her husband, Charles Gerard, second Earl of Macclesfield, bore to Lord Rivers two children, a daughter, who died in infancy (1695), and a son, christened Richard Smith (January 18, 1697), who seems to have died the year of his birth. The Earl obtained a divorce from his wife (1698), who married (1700) Colonel Henry Brett (d.1724). The poet, Richard Savage, probably of obscure birth, openly claimed to be the son christened Richard Smith. According to the usual story, to which Dr. Johnson gave currency in his famous *Life of Savage* (1744), the child, neglected by the Countess, was committed to a nurse and afterwards to her mother, Lady Mason, who sent him to a grammar school at Saint Albans. The Countess prevented Lord Rivers from leaving him £6000, attempted to have him kidnapped and sent off to the West Indies, and finally in despair apprenticed him to a London shoemaker. An accident revealed the secret of his birth, and the boy quitted his obscure trade. The entire account was derived solely from Savage's own statements, and is now wholly discredited. Savage profited by the legend. In 1727 Savage killed a man in a tavern brawl and was sentenced to death, but a pardon was obtained by the intercession of the Countess of Hertford. Lord Tyrconnel, a nephew of Mrs. Brett, received him into his household. In course of time the two men quarreled, and Savage was thrown upon the world. On the death of Laurence Eusden (1730), Savage tried to obtain the laureateship, but failed. The Queen, however, permitted him to address odes to her, and conferred upon him a pension of £50 a year. Two years after the death of the Queen a pension of the same amount was raised by Pope and others (1739), and Savage was sent off to Swansea in Wales. After staying there for a year he went to Bristol, where he was arrested for debt. He died in prison August 1, 1743. His works comprise: *Woman's a Riddle* (performed 1716); *The Convocation*, a poem (1717); *Sir Thomas Overbury*, a tragedy (1723); *The Bastard*, a poem (1728); *The Wanderer*, a poem (1729); and considerable occasional verse.

SAVAGE-ARMSTRONG, GEORGE FRANCIS. See ARMSTRONG, GEORGE FRANCIS SAVAGE.

SAVAGE ISLAND. See NIUE.

SAVAGE'S STATION, or **ALLEN'S FARM,** BATTLE OF. A battle fought near Savage's Station, about 10 miles east of Richmond, Va., on June 29, 1862, during the Peninsular campaign of the Civil War, between a part of McClellan's Federal Army of the Potomac, under Generals Sumner and Franklin, and a part of Lee's Confederate Army of Northern Virginia, under General Magruder. It was one of the Seven Days' Battles (q.v.) fought by General McClellan during his change of base from the York to the James River. After the battle of Gaines's Mill (q.v.) Generals Heintzelman, Sumner, and Franklin were directed by McClellan to hold the Federal lines immediately south of the Chickahominy. This force was weakened on the 29th by the withdrawal of Heintzelman across White Oak Swamp, and by the retirement of Slocum's division of Franklin's corps, which had suffered severely at Gaines's Mill. On the same

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day Magruder, expecting to be supported by Jackson, who had been ordered to cross the Chickahominy at Sumner's Upper Bridge and strike the Federal right flank, but who had been unavoidably delayed, attacked the Federal force with great energy, first at Allen's Farm and then at Savage's Station, but was finally repulsed. The Federals, however, withdrew across White Oak Swamp during the night, leaving to the Confederates 2500 sick and wounded men in the field hospital at Savage's Station. Before and after the battle the Federals destroyed here large quantities of their supplies and munitions of war. Consult: Johnson and Buel (eds.), *Battles and Leaders of the Civil War* (vol. ii., New York, 1887); and Webb, *The Peninsula* (New York, 1881).

SAVAII, sä-vī'ē, or **SAWAII**. The largest and westernmost of the Samoan Islands (q.v.) (Map: Samoa, C 5). It is over 40 miles long and has an area of 660 square miles. It is mountainous and covered with craters. The highest peak of the island, as well as of the group, is Mua (4000 feet). The coasts are mostly precipitous and inaccessible, the only place of anchorage being Mataatu, in the north. The interior is densely wooded and sparsely inhabited, but there are stretches of fertile land along the coasts. The island belongs to Germany and is divided into six administrative districts. Population, in 1900, 13,201.

SAVAN'NAH. The second largest city of Georgia and the county-seat of Chatham County, situated on the west bank of the Savannah River, 18 miles from the Atlantic Ocean (Map: Georgia, E 3). Geographically and commercially it enjoys a position of unusual advantage; historically, it is one of the most interesting cities of the South. The climate, greatly influenced by the Gulf Stream, is mild and pleasant. Though it is hot in summer, cool breezes prevail at night. The average temperature is 66 degrees.

Savannah is situated on a plateau 50 feet above sea level. The plan of the city, in all its extensions, has followed that originally projected by Oglethorpe. The streets, broad and straight and luxuriantly shaded, cross each other at right angles. The number of trees and their beauty have given Savannah the name of 'Forest City.' Among them are magnolias, japonicas, and catalpas. The squares of the city, which, in the original design, were intended as rallying places for the colonists, are especially noteworthy. Forsyth Park is the largest of these places of resort. A handsome monument to the Confederate dead stands in the Parade Ground, the southern extension of the park. In other squares are monuments in honor of Gen. Nathanael Greene, William Washington Gordon, builder of the Central of Georgia Railway, Sergeant William Jasper, the Revolutionary patriot, and Count Casimir Pulaski.

Among the more imposing public buildings are the Post-Office, the Custom-House, the County Court-House, the City Exchange, the Telfair Academy of Arts and Sciences, and the Public Library. The church edifices are numerous and handsome, the style of architecture representing in large measure old colonial ideals. There are a number of good private schools, besides an efficient public-school system. Telfair Hospital for Women, Savannah Hospital, Saint Joseph's Hospital, and the Georgia Infirmary for Colored People are prominent institutions. Near the city are several salt water resorts, which are largely frequented during the summer.

Savannah is surrounded by a fertile territory, especially adapted to the cultivation of rice, cotton, sugar-cane, vegetables, and fruits. Four great railway lines enter the city: the Atlantic Coast Line, the Seaboard Air Line, the Southern, and the Central of Georgia. Its facilities for the expeditious handling of ocean and coastwise freights in large quantities have made it the most prosperous of South Atlantic ports. The broad channel is 26 feet in depth, and is being improved by the Government to afford a greater depth. The terminals of the railroads occupy in the aggregate three miles of wharves. Savannah is the first cotton port on the South Atlantic coast and the first naval stores port in the world. Its exports of lumber are large and are rapidly increasing. The annual export of phosphate rock exceeds that of any other South Atlantic port. The total foreign commerce for the year 1901 amounted to $47,384,000, mostly exports, making it rank fifth among Atlantic ports. Though Savannah is preëminently a shipping centre, considerable manufacturing is carried on, but chiefly for local markets. There are, however, large railroad car and repair shops, fertilizer manufactories, foundries and machine shops, cottonseed oil mills, lumber mills, patent medicine factories, etc. In the census year 1900 the various industries had $5,716,000 capital and an output valued at $6,462,000.

The government is vested in a mayor and a board of aldermen, elected every two years. Most of the administrative officers are chosen by the city council, the park and tree commissioners, however, being nominated by the mayor and confirmed by the council. The board of education is, in a large degree, a self-perpetuating body, entirely removed from partisan politics.

Population, in 1800, 5146; in 1850, 15,312; in 1860, 22,292; in 1870, 28,235; in 1880, 30,709; in 1890, 43,189; in 1900, 54,244. The total in 1900 included 28,090 persons of negro descent. The foreign-born population was small, only 3434.

Savannah was settled in 1733 by a small company under the leadership of Gen. James Edward Oglethorpe. (See GEORGIA.) During the next few years a considerable number of German, English, and Scotch immigrants arrived, among them (in 1735) being Charles and John Wesley. During the Revolutionary War Savannah was fortified by the Americans, and in December, 1778, when occupied by a force of less than 1000, under Howe, it was attacked and captured, December 29th, by 3000 British under Colonel Campbell. In the fall of 1779 an allied army of French and American troops, under D'Estaing and Lincoln, attempted to recapture it, but were repeatedly repulsed, and in the disastrous attack of October 9th the allies lost more than 800 men, Count Pulaski and Sergeant Jasper being mortally wounded. Savannah was incorporated as a city in 1789. In 1796, and again in 1820, it was ravaged by fire, the loss being more than $1,000,000 in the first case and more than $4,000,000 in the second. The first steamship to cross the Atlantic was owned and projected in Savannah, was named after the city, and sailed from this

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port (in 1819) on its voyage to Liverpool. On December 10, 1864, General Sherman reached Savannah, thus completing his famous march to the sea. The city, then having a population of about 25,000, was defended by General Hardee with a Confederate force of 18,000; but Sherman captured Fort McAllister (q.v.) on the 13th, and on the 20th, while the Federal army was preparing to open siege operations on all sides, Hardee hurriedly withdrew by means of a pontoon bridge, destroying the navy yard with the ironclad ram *Savannah*, but leaving 150 heavy guns, large quantities of ammunition, and some 30,000 bales of cotton. Sherman left late in January on his march through the Carolinas, but Savannah was held by a Federal garrison until the close of the war. Consult: C. C. Jones, Jr., and others, *History of Savannah to the Close of the Eighteenth Century* (Syracuse, 1890); Lee and Agnew, *Historical Record of Savannah* (Savannah, 1869); and *Siege of Savannah in 1779* (Albany, 1866).

SAVANNAH RIVER. A river forming the boundary between Georgia and South Carolina. It rises in the Blue Ridge, and flows southeast, entering the Atlantic Ocean through the Tybee Roads, after a course of 450 miles (Map: Georgia, D 2). Its upper course is rapid, and the river carries a great deal of silt, which is deposited near its mouth in low islands and spits, dividing the river into narrow channels. The entrance is being extensively improved by means of jetties, and a 26-foot channel will be secured to the city of Savannah, 18 miles from the sea. The river is navigable for small steamers 230 miles to Augusta.

SAVANNAS (OSp. *savana*, sheet, from Lat. *sabanum*, from Gk. σάβανον, linen cloth, towel). Plant societies intermediate between forests and grasslands and associated with transitional conditions. Climatic savannas, which are abundant in many tropical and warm regions, are parklike, the undergrowth being largely grassy and the trees scattered irregularly. Occasionally edaphic savannas, probably influenced by the grazing of animals, may occur in temperate regions, especially in river bottoms.

SAVARY, sȧ'vȧ'rē', Anne Jean Marie René, Duke of Rovigo (1774-1833). A French general, born at Marcq (Ardennes). In 1797 he accompanied Desaix to Egypt, and after Marengo (1800) Napoleon made him a colonel and aide-de-camp. In 1802 he became general of brigade and was made chief of the secret police; in 1804, as commandant of troops, stationed at Vincennes, he presided at the shameful execution of the Duke d'Enghien. In the wars of 1806-07 he acquired high military reputation, his victory at Ostrolenka (February 16, 1807) being a brilliant achievement. He distinguished himself also at Friedland (June 14, 1807), and was created Duke of Rovigo in the beginning of the following year. He was then sent to Spain by the Emperor and negotiated the arrangements by which Joseph Bonaparte became King of Spain. In 1810 Savary replaced Fouché as Minister of Police and held office until 1814. After the fall of Napoleon, he was confined by the British Government at Malta for seven months, when he succeeded in making his escape, and landed at Smyrna. He returned to Paris in 1818, and was reinstated in his titles and honors. In 1823 he removed to Rome, having given offense to the Court by his pamphlet *Sur la catastrophe de Mgr. le Duc d'Enghien*, in which Talleyrand was charged with the responsibility for the Duke's death, but at the close of 1831 he was recalled by Louis Philippe and appointed commander-in-chief of the Army of Africa. He died in Paris. His *Mémoires* (Paris, 1828) are valuable for the Napoleonic period.

SAVE, säv (Ger. *Sau*). A tributary of the Danube. It rises in the northwestern part of the Austrian Crownland of Carniola, and flows southeast and east through Croatia and along the southern borders of Slavonia, which it separates from Bosnia and Servia till it joins the Danube at Belgrade, after a course of about 450 miles (Map: Austria, E 4). In its lower course it is a sluggish stream, winding between marshy banks, while its shoals and variable volume render navigation difficult. It is, however, navigable for steamers as far as Sissek, 365 miles. It receives its principal tributaries from the right. These include the Kulpa, Unna, Vrbas, Bosna, and Drina.

SA'VERY, Thomas (c.1650-1715). An English inventor, born in Shilstone, Devonshire. He became a military engineer, but devoted himself to mechanical inventions, devising a machine for polishing plate glass in 1696 and in the same year a pair of paddle-wheels worked by a capstan set between them on a boat, a scheme described in a pamphlet *Navigation Improved* (1698; reprinted in 1858 and in 1880). But his fame rests on the steam pumping engine which he patented in 1698, and which was the first to come into practical use, especially in the improved form it took after the association of Savery with Newcomen (q.v.). Savery wrote *The Miner's Friend* (1698), which contains a description of his engine.

SAVIGLIANO, sä'vē-lyä'nō. A town in the Province of Cuneo, Italy, on the Maira, 32 miles by rail south of Turin (Map: Italy, B 3). It is surrounded by walls, and has a triumphal arch. There are a technical school and a library. Savigliano manufactures railway material, wagons, silks, linens, and sugar, and trades in cattle, hemp, and fruit. Here in 1799 the allied Russians and Austrians defeated the French. Population (commune), in 1901, 17,321.

SAVIGNY, sȧ'vē'nyē', Friedrich Karl von (1779-1861). One of the most distinguished of modern European jurists, the founder of the modern historical school of jurisprudence. He was born at Frankfort-on-the-Main, a descendant of an ancient family of Lorraine. He studied at Marburg (1803-08), taught there, at Landshut (1808-10), and at Berlin (1810-42). In 1842 he ceased to teach and became a member of the Prussian Ministry, his especial charge being the preparation of legislative measures. In 1848 he retired to private life. In 1803 he published a treatise on the *Law of Possession* (*Recht des Besitzes*) which gave him a European reputation. In 1814, in reply to a pamphlet by Thibaut, advocating the preparation of a code of laws for Germany, he published his *Vocation of Our Time for Legislation and Jurisprudence* (*Beruf unserer Zeit für Gesetzgebung und Rechtswissenschaft*). In his essay he took the ground that German legal

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science was not sufficiently developed to warrant such an undertaking, but he also set forth the limitations and the perils of codification with a precision and force that have not been excelled. In insisting that law is a product of the life of each nation, he gave to the historical school of jurisprudence its theoretical basis. In 1815, in coöperation with other jurists, he established the *Zeitschrift für geschichtliche Rechtswissenschaft*, which continued to appear until 1850. Its modern successor is the *Zeitschrift der Savigny-Stiftung für Rechtsgeschichte*. Between 1815 and 1831 he published his *History of Roman Law in the Middle Ages* (*Geschichte des römischen Rechts im Mittelalter*), and between 1835 and 1853 his *System of Modern Roman Law* (*System des heutigen römischen Rechts*), which remained unfinished. His miscellaneous writings were collected and published in 1850. In addition to his services to historical jurisprudence, Savigny did much to promote a more fundamental analysis of legal conceptions. There are lives of Savigny by Strutzing (Berlin, 1862) and Landsberg (Leipzig, 1890).

SAVILE, săv'il, or **SAVILLE**, George, Marquis of Halifax (1633-95). An English politician and statesman, born at Thornhill. He was a confidential adviser of Charles II., by whom he was created Earl of Halifax in 1679 and Marquis of Halifax in 1682. In the latter year he was also made Lord Privy Seal, the highest post in the realm. In this position he used his influence to oppose the ambition of James, Duke of York, and to advance the interests of the Duke of Monmouth. When James came to the throne he retained Savile among his advisers, but in a lower office—the presidency of the council. He was, however, almost immediately dismissed from the council because of his opposition to the repeal of the Test and Habeas Corpus Acts. When the storm broke over James he attempted to conciliate the Marquis, who seems to have met the King's advances half-way. But on the arrival of William Halifax went over to him and, next to Somers, exercised the greatest influence in bringing about the new régime. He was again appointed Lord Privy Seal, but he gradually withdrew from political activity. His last years were spent almost entirely in literary work. In politics he was moderate, and worked for what he believed to be his country's good, regardless of party interests and prejudices. This mental attitude, however, made him generally suspected and disliked, and gained him the name of 'Trimmer,' which he accepted as a far from opprobious appellation. His numerous pamphlets are published in a volume entitled *Miscellanies by the Most Noble George Lord Savile, late Marquis and Earl of Halifax* (London, 1700). Consult: Burnet, *History of His Own Time* (Oxford, 1833); *English Historical Review*, October, 1896.

SAVILE, săv'il, Sir Henry (1549-1622). An English scholar, born at Bradley, in Yorkshire. He entered Brasenose College, Oxford, but was transferred to Merton College in 1561, and became fellow of that college in 1565. Subsequently he visited many places on the Continent, collecting manuscripts, and on his return was appointed Greek and mathematical tutor to Queen Elizabeth, 1578; provost of Eton, 1596; warden of Merton College, 1585-1621. He was knighted by James I. in 1604. He founded at Oxford the Savilian professorships of geometry and astronomy, and gave liberally to the university besides the gift of his valuable library. He was the author of a translation of *The End of Nero and Beginning of Galba, fower Bookes of the Histories of Cornelius Tacitus; The Life of Agricola, with Notes* (Oxford, 1591); a folio edition of the *Rerum Anglicarum Scriptores post Bedam Præcipui* (Oxford, 1596); and a folio edition of the works of Saint Chrysostom in 8 vols. (1610-13).

SAVIN, or **SAVINE** (OF., Fr. *sabine*, It. *savina*, from Lat. *savina*, savin, for *Sabina herba*, Sabine herb), *Juniperus Sabina*. A low, much-branched, widely spreading shrub, with small, imbricated evergreen leaves. It grows on mountains in Europe, Asia, and North America, bears small black berries, covered with a pale blue bloom, and has strong smelling aromatic leaves. Two pounds of the tops yield about five ounces of limpid and nearly colorless oil with the odor of the plant and a hot acrid taste. This oil is sometimes used medicinally.

SAVINGS BANK. An institution for the accumulation and profitable employment of small sums, chiefly the savings of the poorer classes. Savings banks originated in the philanthropic movement of the close of the eighteenth century. An institution of this nature was in operation in Hamburg in 1778; another was founded in Oldenburg in 1786. In England a savings bank was founded in London in 1798. In the first two decades of the nineteenth century such institutions were established throughout Western Europe; in 1816 the first one in America was founded at Philadelphia, and by 1820 ten savings banks were in operation in the United States. Since that time such banks have increased steadily in number, until at present no civilized State is wholly without them.

Trustee Savings Banks. Early saving banks were all founded by philanthropists who acted simply as trustees for the depositors, giving their services gratuitously in managing the funds deposited with them. Practically the same plan is followed by most of the private savings banks of England and by the mutual savings banks of America. The system is, however, subject to fraud and reckless management—evils which are of a serious nature, since they check the tendency to save which the bank exists to develop. In many cases the Government endeavors to minimize the risk of bad management by prescribing the classes of securities in which savings banks may invest. National, State, and municipal bonds and real estate mortgages are favorite forms of investment in the United States.

Joint-Stock Savings Banks exist in large numbers, especially in the western part of the United States. Owing to the necessity of earning profits, it is impossible for these banks to make any great effort to secure very small deposits; hence their educational value is limited. The chief purpose they serve is the productive employment of savings of those who enjoy considerable incomes.

Savings Banks in the United States. The following table, from Hamilton, *Savings Institutions*, page 190, illustrates the growth of savings banks (mutual and joint-stock) in the United States:

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	Number of banks	Number of depositors	Deposits	Average due each depositor
1820	10	8,635	$1,138,576	$131.85
1840	61	78,701	14,051,520	178.54
1860	278	693,870	149,277,504	215.13
1880	629	2,335,582	819,106,973	350.71
1890	921	4,258,893	1,524,844,506	358.03
1900	1,002	6,107,083	2,449,547,805	401.10

The efficiency of a system of savings banks may be roughly measured by the ratio of accounts to the total population. By this test, the American system does not prove wholly satisfactory. While the New England States show one account to two of the population, the Western States show only one to 18, the Middle States one to 48, and the Southern States one to 406.

MUNICIPAL SAVINGS BANKS. Municipal action in encouraging saving began in Germany. A municipal savings bank was organized in Karlsruhe about the beginning of the nineteenth century; another was founded at Berlin in 1818. Institutions of this type are now found throughout Germany, operating in the country districts as well as in the towns. They are also the predominant type of bank in Austria and France, and the plan has been successfully employed in Italy, Switzerland, Russia, Denmark, Sweden, and Japan. It presupposes a highly efficient municipal government, and general confidence in the officials on the part of the lower classes. These banks are for the most part organized as quasi-private corporations, having power to own property, make binding contracts, and sue and be sued before the courts. Managers and officials are appointed by the municipality. In large cities the organization consists of a central office with branches located where they will be most convenient to wage-earners. Sometimes these banks undertake to send officials to the homes of small depositors, to collect weekly sums for deposit. These banks have proved highly successful, not only furnishing excellent facilities for saving, but also rendering available a supply of capital for local uses. Loans on real estate are the principal form of investment.

POSTAL SAVINGS BANKS. See under that heading.

SCHOOL SAVINGS BANKS. A great deal of attention has recently been given to plans for training school children in habits of saving. Priscilla Wakefield experimented with a school savings bank early in the nineteenth century. The plan was tried in several parts of Europe in the first half of the century, but first received general recognition in 1866 through the efforts of Professor Laurent in Belgium. The principle has been widely adopted both in Europe and in America. Its usefulness, however, has not as yet been entirely established.

The table below, from the *International Year Book, 1902*, gives the chief facts with regard to savings banks in the more important modern nations.

Consult: Hamilton, *Savings Institutions* (New York, 1902); Wolff, "Savings Banks at Home and Abroad," *Journal of the Royal Statistical Society*, vol. lx.; article "Sparkassen" in Conrad's *Handwörterbuch der Staatswissenschaften*, vol. vi. (Jena, 1901). See BANK.

		No. of depositors	Total deposits	Average deposit
Germany	1898	13,854,927	$1,929,332,000	$139.25
United Kingdom	1901	10,434,877	936,117,000	89.71
France	1900	10,680,866	824,932,000	77.20
Japan	1900	5,825,578	36,948,000	6.34
Italy	1899	5,669,590	448,700,000	79.14
Austria	1900	4,792,611	833,210,000	173.85
Russia	1901	3,935,773	428,345,000	108.83
Belgium	1900	3,537,157	231,684,000	65.50

SAVITAR, sä'vē-tär (Skt., generator, vivifier, stimulator). In Hindu mythology, the sun in his vivifying aspect. Eleven hymns of the Rig-Veda are in his honor, and his name is mentioned in all about 170 times. The preëminent characteristic of Savitar is his golden nature and equipment, his eyes, hands, tongue, and arms being of gold, while he is drawn by radiant steeds in a golden car with a golden pole. His hair, moreover, is yellow, and his garments are tawny. All these attributes, of course, typify the sun. Savitar is one of the most powerful of gods, but his power is uniformly beneficent. In the later Vedic period he comes to be identified, on account of the creative work of the sun, with Prajapati (q.v.). It is significant that the most holy verse of the Rig-Veda, the *Sāvitri* (q.v.), is in honor of Savitar. After the Vedic period this god sinks into obscurity, and is no longer worshiped. Consult: Muir, *Original Sanskrit Texts*, vol. v. (London, 1872); Bergaigne, *Religion Védique*, vol. iii. (Paris, 1883); Macdonell, *Vedic Mythology* (Strassburg, 1897). See PŪṢAN; SŪRYA.

SĀVITRĪ, sä'vē-trē (Skt., ray of light). The name of the most sacred verse of the Rig-Veda (iii. 62, 10). It corresponds in sanctity to the first chapter of the Koran for the Mohammedans and to the Lord's Prayer for the Christians. It is addressed, as its name implies, to Savitar, the sun in his vivifying aspect. The Savitri is repeated by orthodox Brahmans at their morning and evening devotions, and at other times of special religious importance. The name Savitri is also sometimes given to the wife and daughter of Brahma (q.v.). Another Savitri figures as the heroine of one of the most beautiful episodes of the Mahābhārata (q.v.). The episode has been edited by Geiger in his *Elementarbuch der Sanskrit-Sprache* (Munich, 1888), and translated into English by Arnold in his *Indian Idylls* (London, 1883).

SAVOIE, sȧ'vwä' (Fr. for Savoy). A southeastern department of France, bordering on Italy (Map: France, N 6). Area, 2,388 square miles; population, in 1896, 259,790; in 1901, 254,781. It is in the region of the Alps, which reach in the Pointe Aiguille an altitude of 12,670 feet. The River Rhone forms the western boundary for 30 miles, and with its affluent, the Isère, drains the department. The climate varies according to elevation, and is bracing and healthful. Wheat, rye, maize, the grapevine, tobacco, mulberries, and apples are cultivated. There are important manufactures of cheese. Capital, Chambéry.

SAVOIE, HAUTE. A department of France. See HAUTE-SAVOIE.

SAVONA, sȧ-vō'nȧ. A city in the Province of Genoa, Italy, situated on the Gulf of Genoa, 25 miles by rail west-southwest of Genoa (Map: Italy, C 3). It is a well-known Riviera (q.v.) city with fine boulevards and well-built modern

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houses. The sixteenth-century Renaissance cathedral contains some good paintings. Savona has a handsome theatre, an episcopal palace, a technical institute, and a school of navigation. There are also a library and a small picture gallery. The city has important iron and steel foundries and extensive potteries. Other manufactures are cloth, glass, leather, firearms, chemicals, and perfumery. Ship-building and fisheries are also carried on. Population (commune), in 1881, 29,614; in 1901, 38,355. Savona was known as *Savo* under the Romans. In the Middle Ages it was a prosperous maritime republic, but finally succumbed to Genoa.

SAVONAROLA, sä'vô-nä-rô'lä, GIROLAMO (1452-98). A noted Italian preacher and reformer. He was born at Ferrara September 21, 1452. He received a good education and entered the Dominican Order at Bologna in 1475. Fifteen years passed before he came prominently into public notice, and during that period he went through the usual routine of monastic life. In 1490 he went to the Monastery of San Marco in Florence and began to preach sermons of such boldness and fervor that he immediately drew many hearers. Savonarola was then nearly forty years old, but his religious zeal had in it all the quality and fire of a younger man's temperament. Savonarola's nature was eminently one-sided; he was a religious enthusiast, who, seeing about him corruption and ill-doing, found the courage to raise his voice in reproach and in so doing suddenly discovered the secret of popular approval and success. From the pulpit in the Church of San Marco, or of the Duomo near by, he would improvise, in hasty, emphatic fashion, vivid denunciations of the abuses of the day, of the licentiousness of the great, of the worldliness of the dignitaries of the Church; much of his preaching was mystical, prophetic, and apocalyptic. These denunciations possess one special feature that appeals particularly to the many for whom the history of Florence is chiefly the history of Italian art. Savonarola's brief period of influence came just as the earlier inspiration of the religious painters was dying out, just as the great *Cinquecento* period was dawning. His voice was raised loudly against the corrupting influences that were paganizing art, and it may be recalled that his influence was all-powerful with Botticelli, while the grief-stricken Fra Bartolommeo practically ceased to paint after the death of one he loved and looked on as a prophet.

Unfortunately, Savonarola's rapid rise coincided with a period of great political disturbance. Florence, long a democratic republic, had passed under the sway of the Medici. Lorenzo the Magnificent, who died in 1492, had tried, but unsuccessfully, to win over Savonarola, whose denunciations were openly directed at the reigning house and its supporters. But two years after the accession of Lorenzo's son and successor, Piero, in 1494, Charles VIII. of France invaded Italy at the head of a powerful army to assert a claim to the throne of Naples. Piero at first opposed the French, then treated, but displayed such weakness that his opponents took courage and rose, driving him from Florence. The *Piagnoni* (weepers) then came into power, and this puritanical democratic party was that in which Savonarola had found his most fervent supporters. His influence now dominated the government of the city and, unfortunately for him, some of his eloquent appeals of former years were construed into a prophecy of the coming of the French. Events had proved him a true prophet, and the faith of the people in their preacher accordingly increased. His voice rose louder and still louder in denunciation of men and things. He aimed, in fact, at establishing an ideal Christian commonwealth. So great was his hold on those who listened to his preaching that for some months Florence was profoundly moved by religious enthusiasm and appeared a new city. The preacher's sway did not last long; he had set his standard too high and the Florentines soon wearied of virtue. Reaction set in. The party of the Medici, known as the *Arrabbiati* (maddened), began to recover ground. Savonarola had extended the field of his attacks to the Pope, Alexander VI., who, inspired perhaps more by political than by religious motives, became hostile to the Dominican preacher.

In 1495 Savonarola was forbidden to appear in the pulpit for some months. Internal dissension in Florence provoked severe measures on the part of the *Piagnoni* against the *Arrabbiati*, and the popularity of the democratic party rapidly declined, as did that of Savonarola. In 1497 the Pope appears to have excommunicated him, but Savonarola declined to accept the Papal command and openly rebelled from the authority of the Pope. Shortly afterwards the *Arrabbiati* won some measure of success in the city elections, and Savonarola was ordered to discontinue his preaching. A Franciscan friar was then put up to accomplish the Dominican's complete downfall, and proposed as a test of their respective merits the ordeal by fire: the two champions were to pass down a long and narrow lane of fire between two lofty piles of blazing logs. Savonarola's enthusiastic disciples accepted the Franciscan's challenge without hesitation and offered to follow their prophet into the flames. He, however, was apparently already losing faith. He allowed another Dominican to take his place, but on April 7, 1498, when all Florence assembled to witness the trial, endless delays and difficulties resulted in a fruitless adjournment. It was evident that the popular enthusiasm was dead, that Savonarola had lost his hold on the Florentines. The *Arrabbiati* now felt they could push their attack home. The Convent of San Marco was attacked; Savonarola was imprisoned and tried for heresy and sedition. The trials, secular and religious, were long and accompanied by much torture, under which he broke down. On May 23, 1498, he was hanged and two other Dominicans with him, and their bodies were burned. Pastor declares in his *History of the Popes* that from the letter of the Papal commissioners, May 23, 1498, it is evident that the charge of heresy in Savonarola's case is to be understood in the constructive, not in the strict, sense. His writings were numerous, an excellent selection from them being that by Villari and Casanova, *Scelta di prediche e scritti* (Florence, 1898). For bibliographies of works on and by Savonarola, see Gherardi, *Nuovi documenti e studj* (ib., 1888); Olschki, *Bibliotheca Savonaroliana* (ib., 1898). The standard history of his life is by Villari (Eng. transl., London, 1899), in addition to which the following may

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be consulted: Hurtand, *Lettres de Savonarola* (Paris, 1900); Pastor, *Zur Beurtheilung Savonarolas* (Freiburg, 1898); Horsburgh, *Savonarola* (London, 1901); O'Neil, *Savonarola* (Boston, 1898); id., *Was Savonarola Excommunicated?* (ib., 1900); Luitto, *Il vero Savonarola* (Florence, 1897); Gruyer, *Illustrations des écrits de Savonarola et ses paroles sur l'art* (Paris, 1879); Schnitzer, *Quellen und Forschungen zur Geschichte Savonarolas* (Munich, 1902); Lucas, *Frà Girolamo Savonarola* (London, 1900).

SAVONNERIE, sâ'vôn'rê', La (Fr., soap factory). A carpet factory in Paris, established by Maria de' Medici in 1604 and included in the Gobelins in 1826. Its name is derived from the use to which it was originally put.

SAVORY (OF. *savoree, sadree, sadariege, saturige*, Fr. *savorée*, from Lat. *satureia*, savory), *Satureia*. A genus of annual or perennial herbs and sub-shrubs of the natural order Labiatæ, natives of Southern Europe and the East. The common or summer savory (*Satureia hortensis*), an annual 6 to 12 inches high, with white or lilac flowers, commonly cultivated in kitchen gardens for flavoring food, has a strong, agreeable aromatic smell, and pungent taste. Winter savory (*Satureia montana*), a sub-shrub with prickly pointed leaves and larger flowers, is used in the same way. Summer savory is propagated by seed; winter savory usually by slips and cuttings. See Plate of Flowers.

SA'VORY, Sir William Scovell (1826-95). An English surgeon, born in London, and educated at Bartholomew's Hospital, in the College of Surgeons, and at London University. In the hospital he was surgical and anatomical demonstrator (1849-59), surgeon (1867-91), and governor (1891-95). But his most important post was that of lecturer on surgery, a double chair, which he occupied with a colleague from 1869 to 1879, and alone until 1889, receiving £2000 a year during the latter decade. In the Royal College of Surgeons he was president from 1885 to 1889. Savory became surgeon extraordinary to the Queen in 1887, and in 1890 a baronet. His declaration against 'Listerism' in 1879 ranks him with the conservatives and he was a man of ability rather than brilliancy. He wrote *Life and Death* (1863).

SAVOY, sâ-voi' (Fr. *Savoie*). Formerly a duchy lying between Italy and France, subsequently a part of the Kingdom of Sardinia (q.v.), and since 1860 a part of France. Savoy is situated in the region of the Western Alps. It borders on the north on Lake Geneva, and on the west it is bounded partly by the Rhone, whose affluents drain the region. In the southeast the Graian Alps form a great wall on the side of Piedmont. The summit of Mont Blanc, the highest peak of the Alps, is within the borders of Savoy. There are several lakes, among them Bourget and Annecy, and a number of mineral springs, the most noted being those of Aix-les-Bains, Saint-Gervais, and Evian. The inhabitants, Savoyards, are essentially French. Under Sardinian rule Savoy was divided into the provinces of Chablais, Faucigny, Genevois, Maurienne, Savoy Proper, Upper Savoy, and Tarantaise. The largest town in the region is Chambéry. The region constitutes the departments of Savoie and Haute-Savoie (qq.v.). Savoy was included in the Roman provinces of Gallia Transpadana and Gallia Narbonensis. It was overrun in the early part of the fifth century A.D. by the Burgundians, who in 534 came under the domination of the Franks. Its subsequent history is best traced under Burgundy, and from the beginning of the eleventh century under Savoy, House of.

SAVOY, House of. The oldest reigning family in Europe, a cadet branch of which, that of Savoy-Carignan, occupies the throne of Italy. The house was founded by Humbert (c. 1003-c.1056), who was constable of the Emperor Conrad II. He seems to have received from Rudolph III., last King of Arles, the territories, partly French and partly Italian, which formed the nucleus of the little sub-Alpine State of Savoy, and with these the title of Count (1027). His loyalty to Conrad, who annexed the Arletan dominions to the Holy Roman Empire, gained for him additional territories and Imperial recognition of his title about 1036. His son Odo (died c.1060) succeeded to the title, and by his marriage with Adelaide, Countess of Turin, he greatly extended his dominions. In the succeeding three centuries the possessions of the family were largely extended in Piedmont, and parts of Switzerland came under its sway. In the thirteenth century the house was divided into a Savoyard and a Piedmontese line, but in 1418 Piedmont was reunited with Savoy. Amadeus VI. of Savoy (1343-83) was a vigorous and able ruler. Amadeus VII. (1383-91) secured Nice and thus gave Savoy an outlet to the sea. Amadeus VIII. (1391-1451) by his support of the Emperor Sigismund secured the erection of Savoy into a duchy (1416). In 1434 he handed over his authority to his son Louis and retired to a hermitage. Five years later, although he was not a priest, he was elected Antipope by the Council of Basel as Felix V. (q.v.), but he was not recognized by the Church at large.

At the time of the Reformation the authority of the dukes of Savoy over Geneva came to an end, and they were dispossessed of their Swiss territories. During the wars between the Emperor Charles V. and Francis I. of France, the latter in 1535 seized the dominions of the House of Savoy, which were not restored until the Treaty of Cateau-Cambrésis, in 1559, when they were handed over to Emmanuel Philibert (1559); this able and energetic prince, the victor of Saint-Quentin (q.v.), restored the broken prosperity of the country, and did away with the Austrian and French factions. His son, Charles Emmanuel I. (1580-1630), called the Great, who married a daughter of Philip II. of Spain, was engaged in long wars with France, which allowed him to retain the strategically important Saluzzo, which he had conquered, only at the cost of considerable territory along the Rhone. At the close of his reign he engaged in the War of the Mantuan Succession, in which Savoy was an ally of the Hapsburgs against Louis XIII. The contest was terminated soon after the accession of Victor Amadeus I. (1630-37), who in 1631 received part of Montferrat, but was forced to surrender the important fortress of Pinerolo and other places to France. Victor Amadeus I. did much for the internal improvement of the country and reorganized the University of Turin. This brief reign was followed by minorities and regencies during which the State formed a buffer between France and Spain and suffered at the hands of

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both. Victor Amadeus II. (1675-1732) married a niece of Louis XIV., and was compelled for a time to submit to the demands of the French King, who forced him to persecute the Waldenses, and finally by imposing humiliating requirements upon him drove him, in 1690, into the Grand Alliance. In 1696 a treaty very favorable to Savoy detached the duchy from the Grand Alliance. Victor Amadeus II. entered the War of the Spanish Succession as the ally of France and was placed in command of the combined French and Spanish armies. He was defeated at Chiari in 1701 by his cousin, Prince Eugene of Savoy. In 1703 the Duke gave up the French alliance and joined Austria. The French under Vendôme then overran and devastated Piedmont, but after Vendôme's recall they were routed by the Duke and Prince Eugene under the walls of Turin, September 7, 1706. Victor Amadeus II. in the Treaty of Utrecht (1713) was accorded by Spain the possession of Sicily. The alliance with Austria also added the remainder of Montferrat to Savoy. Sicily was exchanged in 1720 for Sardinia (which had been given to Austria), and Victor Amadeus II. assumed the title of King of Sardinia. (For the subsequent history of the House of Savoy, see SARDINIA, KINGDOM OF, and ITALY.) In 1831 the succession to the throne of Sardinia passed to Charles Albert of the line of Savoy-Carignan. (See CARIGNANO.) Charles Albert was followed in 1849 by his son Victor Emmanuel II., who in 1861 assumed the title of King of Italy. Victor Emmanuel in 1860 ceded Savoy and Nice to France. He was succeeded in 1878 by Humbert. The latter's son, Victor Emmanuel III., ascended the throne on the death of his father in 1900.

Consult: Saint-Genis, *Histoire de Savoie* (Chambéry, 1868), a comprehensive study, based on the sources, from the origins to 1860; Doneaud, *La maison de Savoie* (Paris, 1869); Wiel, *The Romance of the House of Savoy, 1003-1519* (New York, 1898). See ITALY; CHARLES ALBERT; CAVOUR; VICTOR EMMANUEL II.; HUMBERT I.; VICTOR EMMANUEL III.

SAVOY, THE. A chapel in London, on the Thames, occupying the site where once stood the palace built in 1245 by Peter, Earl of Savoy and Richmond. In this building the French King John II. was imprisoned after his capture at the battle of Poitiers in 1356. The palace was twice the object of popular violence. It narrowly escaped destruction in an outbreak caused by the Duke of Lancaster's protection of Wiclif; and in Wat Tyler's insurrection it was burned and made a heap of ruins. In 1505 Henry VIII. erected on these ruins a house for the support of destitute, diseased, helpless, and homeless persons. This well-intended charity soon became a refuge for the dissolute and vicious. It was suppressed by Edward VI., but was restored by Queen Mary, and profusely refurnished by the ladies of her Court from their private resources, but in the management of this establishment great abuses prevailed. Its officials embezzled the funds, and the inmates continued to come from the degraded and criminal classes. The combined hospital and poorhouse maintained a nominal existence under the reign of Queen Anne. In building the Waterloo Bridge in 1810, the deep foundations on which the ancient buildings had rested were all removed. Nothing remained but the chapel built alongside these ruins by Henry VII. This chapel was made a church by Queen Elizabeth, and was one of the chapels royal, under the name of Saint Mary-le-Savoy. It was injured by fire in 1864, but was rebuilt and furnished for public worship by Queen Victoria. The vaults beneath contain the remains of many persons of distinction. Consult Loftie, *Memorials of the Savoy* (London, 1878).

SAVOY CONFERENCE. The name given to an ecclesiastical conference held in 1661 at the Savoy Palace, London, between the Episcopalian and Presbyterian divines, with the view of ascertaining what concessions would satisfy the latter, and thereby lead to "a perfect and entire unity and uniformity throughout the nation." During the rule of Cromwell the Church of England had been in a very anomalous condition. Most of the clergy who held office during the early period of the civil wars were strong Royalists, and either were ejected or fled when the cause of the Parliament triumphed. Their places had been supplied in many cases by zealous Presbyterians—a rather numerous body in England at that time—and thus it happened at the restoration of Charles II. that a considerable section of the ministers within the Church were hostile to the reintroduction of Episcopalian order and practice. Aware of this feeling, yet desirous of not adopting severe measures, if such could possibly be avoided, the King issued letters patent dated March 25th, appointing twelve bishops, with nine clergymen as assistants on the side of the Episcopal Church, with an equal number of Presbyterian divines, "to advise upon and review the Book of Common Prayer." Consult the "Order for the Savoy Conference," in Gee and Hardy, *Documents Illustrative of English Church History*, pp. 588-594 (London, 1896). Richard Baxter, with the consent of the Presbyterian Party, drew up a 'reformed liturgy' which the Episcopalian commissioners would not look at, considering the wholesale rejection of the older one *ultra vires* on their part. It was never used, but was republished by Prof. C. W. Shields, *Book of Common Prayer . . . as amended by Westminster Divines, 1661* (Philadelphia, 1867; new ed., New York, 1880). Finally, the parties separated without arriving at any conclusion; and this fruitless attempt at 'comprehension' was followed in 1662 by the Act of Uniformity (q.v.).

SAVU, sä-vōō' (or **SAVOU**) **ISLANDS.** A group of three islands in the Dutch East Indies, situated between longitudes 122° and 123° E., and latitudes 10° 25′ and 10° 36′ S., southwest of Timor and southeast of Sandalwood (Map: East India Islands, F 7). The largest of the group, Great Savu, has an area of about 240 square miles. The soil is fertile and produces rice, indigo, sugar, tobacco, etc. The population consists of Malays, and once numbered nearly 40,000. The present estimate is about 16,000, of whom 13,000 are on Great Savu.

SAW (AS. *saga*, OHG. *saga*, *sega*, Ger. *Säge*, saw; connected with Lat. *secare*, to cut, *securis*, axe). An important tool used in working timber and metal. The wood saw usually consists of a long strip of thin steel, with one edge cut into a continuous series of sharp teeth. The two chief classes of saws are cross-cut saws and rip-saws. In the former the teeth are designed to

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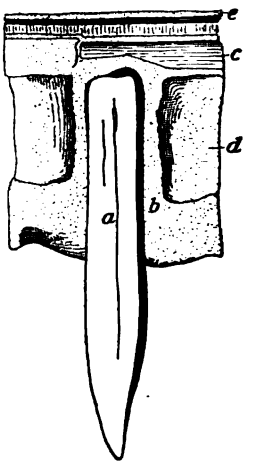
cut at right angles to the fibre of the wood, while in the latter they are adapted to cutting in the direction of the fibre and are alternately bent or set so that they make a broader cut than the thickness of the blade. The hand-saw has a blade broader at one end than the other, and a wooden handle fixed to the broader end. During the nineteenth century the *circular saw*, patented by Samuel Miller in England in 1777, came into universal use wherever machinery could be had for working it. It is generally so fitted as to be worked under a flat bench, a part only of the blade projecting through a narrow slit cut in the top of the bench. It is revolved with great rapidity, and the wood resting on the bench is pushed against the saw. Circular saws are made in diameters from 1 inch to 70 inches, and are extensively used in sawing logs into boards, planks, and other forms of timber. (See SAWMILL; WOOD-WORKING MACHINERY.) The *band-saw* was invented in 1808 by William Newberry, an Englishman. It consists of a very long band or web, as it is called, of steel, usually very narrow, and with finely cut teeth. The two ends are joined together so as to form an endless band, which is passed over two revolving drums, one above and the other below the working-bench, through holes in which the saw passes. The *cylinder saw* or crown saw is another variety, which was an invention of great antiquity. It is used for cutting curved staves for barrels, button blanks, sheaves, and other special forms. (See COOPERAGE.) For descriptions of saws for metal-working, see METAL-WORKING MACHINERY.

SAWAII, sä-vī'ē. The largest of the Samoan Islands. See SAVAII.

SAWDUST. A by-product obtained from sawmills and other wood-working machinery. Besides its uses as a packing material, a stuffing for dolls and cushions, and an absorbent covering for floors, such substances as vegetable charcoal, tar, oxalic acid, and wood alcohol are made from it. In preparing oxalic acid the sawdust is first saturated with a concentrated solution of soda and potash in the proportion of two of the former to one of the latter; it is then placed in shallow iron pans, under which flues run from a furnace, whereby the iron pans are made hot, and the saturated sawdust runs into a semi-fluid pasty state. It is stirred about actively with rakes, so as to bring it all in contact with the heated surface of the iron, and to granulate it for the succeeding operations. It is next placed in similar pans, only slightly heated, by which it is dried. In this state it is oxalate of soda mixed with potash. It is then placed on the bed of a filter, and a solution of soda is allowed to percolate through it, which carries with it all the potash, leaving it tolerably pure oxalate of soda. It is then transferred to a tank, in which it is mingled with a thin milk of lime, by which it is decomposed, the lime combining with the acid to form oxalate of lime, and the soda being set free. Lastly, the oxalate of lime is put into a leaden cistern, and sulphuric acid is poured in; this takes up the lime, and sets free the oxalic acid, which readily crystallizes on the sides of the leaden cistern, or on pieces of wood placed there for that purpose.

In making charcoal the sawdust from hard and soft woods must be kept separate, as the former requires much more intense heat than the latter. After careful sifting the sawdust is carbonized in fire-clay, plumbago, or cast-iron retorts. The resulting charcoal is sifted to remove the calcareous matter which has been detached during the burning process. This charcoal is used to remove unpleasant flavors from wine and as a filtering medium, especially in distilleries. An English patent was taken out in 1896 for making an artificial wood from a mixture of sawdust and certain quantities of gums, resins, or other suitable agglutinants, either in a dry state or dissolved, the compound being subjected to pressure at a temperature high enough to melt the gums. According to another English patent, taken out a year later, sawdust may be so prepared as to be non-inflammable, to be used as a jacketing for boilers and similar purposes. Sawdust, like other wood, may also be distilled by a process which not only saves the charcoal, but also furnishes such products as alcohol and tar.



TOOTH OF A SAWFISH.

Section of the rostrum including one tooth (*a*): *b*, ossified part of rostrum; *c*, canal for vessels supplying the tooth; *d*, medullary cavity of rostral cartilage; *e*, granular skin or shagreen.

SAWFISH. One of the elongated, shark-like rays of the family Pristidæ, remarkable for prolongation of the snout into a flat bony sword, armed on each edge with about twenty large bony teeth, a formidable weapon for killing prey among shoals of fishes, slaying them right and left. Whales are said to be killed by saw-fishes occasionally, and the saw has been sometimes driven through the hull of a ship. About five species are known, living in the warm seas. One, the 'pez sierra' of the West Indies, is common about Florida and in the Gulf of Mexico, and ascends the Mississippi and other Southern rivers. It is often 15 feet long, a fourth of which measures the 'saw.' It plays havoc with fishermen's nets. See Plate of LAMPREYS AND DOGFISH.

A family of sharks (Pristiophoridæ) similarly armed occurs in the Pacific Ocean.

SAW-FLY. A hymenopterous insect of the superfamily Tenthredinoidea, so named on account of the saw-like ovipositor of the female, which serves to drill holes in vegetable tissues and to assist in conveying the eggs into these holes. The saws are mechanically perfect tools. About 2000 species are known, most of which are found in temperate and cold regions. Many saw-flies in the larval stage are highly injurious to vegetation. The largest of the common North American saw-flies is *Cimbex Americana*, whose eggs are laid in the leaves of the elm, birch, linden, and willow. See ROSE INSECTS; PEAR INSECTS; CURRANT INSECTS.

SAWMILL. The mill or machine by which logs are sawed into boards and timber; by popular extension, the building, with its machinery, in which timber is sawed. The first form of saw-

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mill was the sash sawmill, whose general construction and operation are shown by Fig. 1. In this the saw, which is simply a properly toothed straight band of steel, is strained taut by means

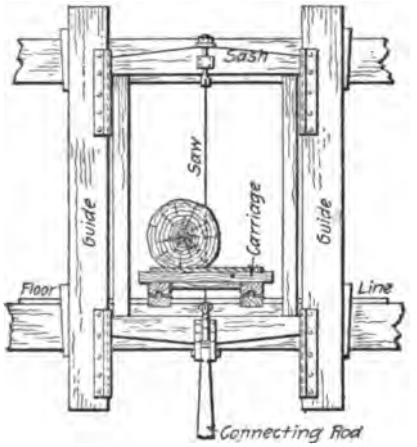

FIG. 1. SASH SAWMILL.

of the rectangular frame or sash, and this sash is given a vertical reciprocating movement between upright guide timbers by means of a connecting rod whose lever end extends to a crank on one end of an engine or water-wheel shaft. The log to be cut is fed endwise against the saw by means of a traveling carriage. In usual practice the sash sawmill makes about 150 strokes per minute and produces about 2000 feet, board measure, in ten hours. The next development in sawmills was the invention of the 'muley' sawmill (Fig. 2), the chief merit of which, compared with the sash sawmill, was the great reduction in the weight of the reciprocating parts. The saw is clamped to two light cross-heads, one at each end, which work up and down, but is not strained or kept taut by tension as it was in the sash in the earlier sash sawmill. To keep the saw straight in its movement, upper and lower guides, aided by the cross-heads and the log itself, were depended upon. The muley sawmill was followed by circular sawmills.

In the circular sawmill the saw is a circular disk of steel with teeth on its edge. This is mounted on a shaft which is given rapid rotary motion by gearing or belting operated by a water-wheel or steam engine. The saw projects something less than half its diameter above the frame or carriage on which the log is placed and fed endwise against the teeth. The circular sawmill gave a continuous cutting motion of from 6000 to 9000 feet per minute, with which great advantage, however, it combined a number of disadvantages. Its rigidity or capacity to maintain a true plane of rotation decreases with the diameter of the saw, or, in other words, with the depth of cut, and this is obviously just the reverse of the requirements. The only way to increase its rigidity is to increase the thickness of the disk, and this means the cutting of a wider gash or kerf and a waste of a greater portion of the log in sawdust. All things considered, it was found impracticable to employ a circular saw much exceeding six feet in diameter. Less than half of this diameter is the cutting depth of the saw. To saw logs of greater diameter than about two feet, therefore, it is necessary to employ two saws, one mounted above so as to cut a kerf downward into the log and the other mounted in the ordinary way to cut a kerf upward to meet the kerf formed by the upper saw. It has been estimated by reliable authorities that the kerf waste with circular saws is about 20 per cent. greater than with the band sawmill, which succeeded them in the order of development.

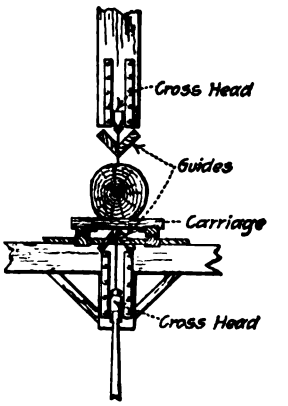

FIG 2. 'MULEY' SAWMILL.

The band sawmill (Fig. 3) was known long before the circular sawmill had come into general use, but its adoption was delayed for many years by the difficulty of making saws which would endure under the severe service. When once it was possible to secure durable saws the development of the band sawmill was exceedingly rapid,

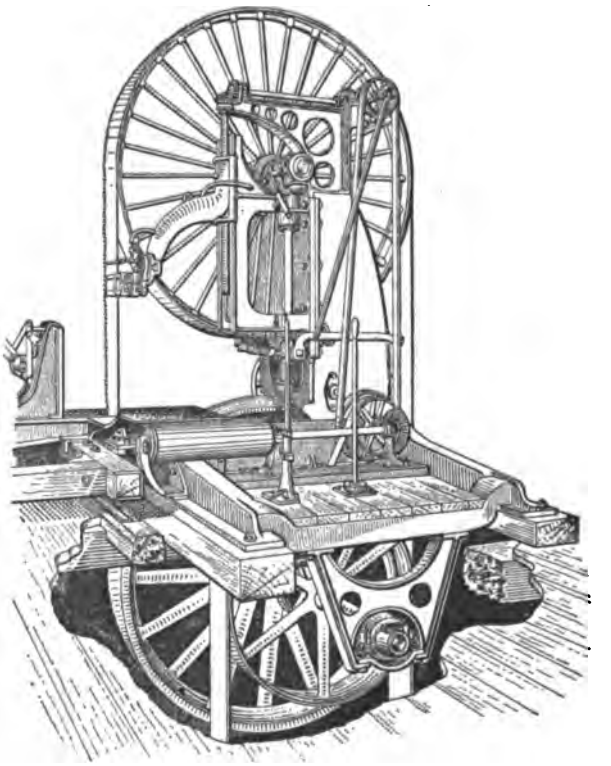

FIG. 3. AMERICAN BAND SAWMILL.

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and it is now generally used for sawing timber in all countries where the lumber industry has reached a high plane of commercial importance. This mill consists of a frame or standard carrying two broad-faced wheels mounted one above the other. Over these wheels a continuous band of steel works exactly like a belt between two pulley wheels. This steel band is the saw and the logs are fed endwise against its toothed edge by traveling carriages. In a modern band sawmill the saw has a continuous cutting speed to 80,000 feet, board measure, per day.

The most recent development in sawmills is the gang sawmill, and this has received its highest development in Europe, where the size of timber is smaller than in America. A gang sawmill operates on much the same principle as the old sawmill illustrated in Fig. 1. Indeed, if we imagine the single saw of Fig. 1 to be replaced by a dozen or more parallel saws spaced equal distances apart we have a very correct notion of a gang sawmill, except that in modern construction the mill is a compact self-contained construction of iron and steel, which often is in one piece with the steam engine which operates it. The gang sawmill usually operates on timber which has been roughly squared by band or circular sawmills, and its merit is, as is quite obvious, that it cuts the whole timber into boards in one passage through the mill. The forms of sawmills which have been described are specialized for such work as sawing shingles, clapboards, etc., by arranging and grouping the saws and by providing special carriages for automatically feeding the timber to the saws in such a manner as to produce the particular form of timber required. A sawmill plant is a plant in which logs from the lumber camps are sawed into rough lumber. According to the United States census there were in the United States in 1900 31,883 sawmill plants in operation. These plants represented a capital of $805,785,226, employed 229,717 wage-earners, consumed raw material valued at $226,138,992, and turned out a finished product valued at $422,812,061. See LUMBER INDUSTRY; WOOD-WORKING MACHINERY.

SAWNEY. See NATIONAL NICKNAMES.

SAW-VIPER. A small viper of the Old World deserts, marked with a dorsal series of light spots, and a zigzag line along each side suggesting the teeth of a saw. It is fierce, aggressive, and very poisonous; and it has the peculiarity of making a "curious, prolonged, almost hissing sound, by rubbing the folds of the sides of the body against one another, when the serrated lateral scales grate together." The most widely distributed species, called 'eja' in Egypt, is *Echis carinata*, occurring from Morocco to Northern India; a second species (*Echis colorata*) inhabits Arabia and Palestine. Consult authorities cited under VIPER.

SAW-WHET OWL. A small brown-streaked owl (*Nyctala Acadica*), without ear-tufts, rather common in the Northeastern States and Canada, so named from its curious rough cry.

SAW'YER, LEICESTER AMBROSE (1807-98). An American biblical scholar, one of the first of the higher critics in this country. He was born in Pinckney, N. Y., studied at Hamilton College and at Princeton Theological Seminary, was ordained to the Presbyterian ministry in 1832, but left that communion in 1854, after having been pastor in New York and Connecticut and president of Central College, Ohio, and entered the Congregational ministry. Sawyer abandoned the doctrine of verbal inspiration, retranslated the Bible, publishing the New Testament in 1858 and the prophetical books of the Old Testament in 1860, and wrote: *Elements of Biblical Interpretation* (1834); *Organic Christianity* (1854); and *Final Theology* (1879).

SAX, sâks, CHARLES JOSEPH (1791-1865). A Belgian-French instrument maker, born at Dinant-sur-Meuse. In 1815 he established himself in Brussels and soon became known for his brass instruments, although he also made other instruments. He is credited with the discovery of the exact proportion for the scale of wind instruments most conductive to a full round tone. Together with his son, ADOLPHE (1814-94), he made many improvements in musical instruments. Adolphe perfected the clarinet and the bass clarinet, and invented the saxophone (q.v.)

SAXA RUBRA (Lat., red stones). A station of the ancient Via Flaminia, eight miles north of Rome, so called from the red volcanic tufa of the locality. Here Maxentius was defeated in 312 by Constantine.

SAXE, JOHN GODFREY (1816-87). An American humorous poet. He was born in Highgate, Vt., and graduated at Middlebury College. He was called to the bar in 1843, and in 1850 bought the Burlington (Vt.) *Sentinel*, which he ran for six years. He then became Attorney-General of Vermont and deputy collector of customs. Later he was editor of the Albany (N. Y.) *Evening Journal*, wrote and lectured, and published verses in the *Knickerbocker Magazine* and *Harper's Weekly*. His works include: *Progress: A Satirical Poem* (1846); *Poems* (1850); *The Money-King, and Other Poems* (1859); *Clever Stories of Many Nations Rendered in Rhyme* (1865); *The Masquerade, and Other Poems* (1866); *Fables and Legends of Many Countries* (1872); *Leisure-Day Rhymes* (1875). His verse abounds in burlesque and puns, but there are not wanting sketches with genuine human interest.

SAXE, sâks, MAURICE, Count de (1696-1750). A French marshal, born at Goslar, Germany. He was the illegitimate son of Augustus the Strong, Elector of Saxony and King of Poland, and the Swedish Countess Aurora von Königsmark. When only twelve years of age he joined the army of Prince Eugene, and took part in the capture of Lille and the siege of Tournay. In 1711 he served with the Russo-Polish army before Stralsund. He took part in a campaign against the Turks in 1717, and in 1720 he went to Paris, where he studied military tactics and engineering. In 1726 he was elected Duke of Courland, but he incurred the enmity of both Russia and Poland and was compelled to retire to France in the following year. Joining the French army on the Rhine, under the Duke of Berwick, he distinguished himself at the siege of Philippsburg (1734), and in the battle of Ettingen. For these services he was made a lieutenant-general in 1736; and on the breaking out of the War of the Austrian Succession, he obtained the command of the left wing of the French army which was appointed to invade Bohemia. He captured Prague and Eger (1741) and showed signal ability in the field, and in 1744 was made a marshal of France and ap-

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pointed to command the French army in Flanders. In the following year he laid siege to Tournay. On May 11, 1745, he met the combined forces of the English, Hanoverians, Dutch, and Austrians under the Duke of Cumberland at Fontenoy, and after a desperate struggle in which the allies were disorganized by his artillery fire, won a decisive victory. During the four succeeding months every one of the strong fortresses of Belgium fell into his hands. On October 11, 1746, Marshal Saxe gained the victory of Raucoux over the allied armies under Charles of Lorraine, for which he was rewarded with the title of Marshal-General of France, an honor which only Turenne had previously obtained. At Laffeld (July 2, 1747) the English army under the Duke of Cumberland was again defeated by Saxe, and the capture of the fortress of Bergen-op-Zoom brought the allies to think of peace. The Dutch, however, were still disposed to hold out, till the capture of Maestricht (1748) destroyed their hopes, and the Peace of Aix-la-Chapelle followed. Saxe died November 30, 1750. Saxe's work on the art of war, entitled *Mes rêveries*, was published at Paris in 1757, and contains many novel and audacious ideas. In 1794 appeared his *Lettres et mémoires*. For his life, consult: De Broglie, *Maurice de Saxe et le Marquis d'Argenson* (Paris, 1891).

SAXE-ALTENBURG, äl'ten-bōōrk. A duchy and constituent State of the German Empire, consisting chiefly of two nearly equal parts, of which the western is situated between Saxe-Weimar and Reuss, and the eastern between Reuss and Saxony. There are also a number of small exclaves. The total area is 511 square miles. The eastern part is broken somewhat by the offshoots of the Erzgebirge and has an undulating surface. The western part belongs to the region of the Thuringian Forest and is more mountainous. The Saale waters the western, and the Pleisse the eastern part. The latter portion is agricultural and very fertile. In the western part these conditions are less favorable, but the forests are an important source of income. Stock-raising is well developed. There are considerable deposits of lignite. The chief manufactures are woolens, gloves, iron products, glassware, porcelain, and woodenware. The Diet consists of 30 members, of whom 9 represent the most highly taxed citizens, 9 towns, and 12 the rural districts. The members of the Diet are elected directly for three years. Saxe-Altenburg has one vote in the Bundesrat and returns one Deputy to the Reichstag. Population, in 1890, 170,864; in 1900, 194,914, chiefly Protestants. Capital, Altenburg (q.v.).

History. In the Middle Ages a part of the region now comprised within Saxe-Altenburg was an Imperial domain, until in 1329 it was acquired by the margraves of Meissen. Another part, which was ruled by the landgraves of Thuringia, also passed into the possession of the same house. Upon the division of the Wettin lands in 1485 Saxe-Altenburg fell to the Ernestine line, from which it passed after the War of the Schmalkald League (1546-47) to the Albertine branch. The town of Altenburg and some other places, however, were restored in 1554 to the Ernestine branch. The elder House of Altenburg was founded in 1603 and became extinct in 1672. The greater portion of the land, thereupon, was united with Gotha. Upon the extinction of the ducal line of Gotha in 1825, Altenburg passed in the following year to Duke Frederick of Hildburghausen, who founded the new line of Saxe-Altenburg. The duchy became a member of the North German Confederation in 1866 and of the German Empire in 1871.

SAXE-COBURG-GOTHA, kō'bōōrk gō'tä. A duchy and constituent State of the German Empire, consisting of the two duchies of Coburg and Gotha, the former bordering on Bavaria and the latter on Prussia. Area, 755 square miles. Both portions of the duchy belong to the region of the Thuringian Forest and are mountainous with well watered and wooded fertile valleys. Agriculture is the principal occupation and considerable crops of cereals are raised. The vine is cultivated to some extent in Coburg. Stock-raising is also well developed. The manufactures comprise machinery, safes, small iron and steel ware, textiles, paper, buttons, leather, footwear, etc. Both duchies are well supplied with transportation facilities. The duchies of Coburg and Gotha have two separate Chambers of 11 and 19 members respectively, elected directly by restricted suffrage for four years. The common affairs of the two duchies are transacted by the two Chambers meeting in common, alternately at Coburg and Gotha. There is one Ministry divided into two sections and presided over by the Minister of State. Saxe-Coburg-Gotha is represented by one member in the Bundesrat and returns two Deputies to the Reichstag. Population, in 1890, 206,513; in 1900, 229,550, almost exclusively Protestants.

History. The town of Coburg was acquired about the end of the fourteenth century by the House of Wettin (see Saxony), and upon the partition of the Wettin lands in 1485 it fell to the Ernestine line. In 1680 Albert, the son of Ernest the Pious of Saxe-Gotha, founded the line of Saxe-Coburg, which, however, became extinct in 1699. In 1735 Coburg was acquired by the Duchy of Saxe-Saalfeld, which became the Duchy of Saxe-Coburg-Saalfeld, with Coburg as its capital. In 1826 Duke Ernest III. ceded Saalfeld to Saxe-Meiningen, receiving Gotha in exchange, and henceforth called himself Ernest I. of Saxe-Coburg-Gotha. The feudal Constitution survived in Gotha down to 1849, when a liberal one was inaugurated. The connection between Coburg and Gotha was merely personal until 1852, when a constitution was enacted for both duchies, the union being further consolidated in 1874. Saxe-Coburg-Gotha joined the North German Confederation in 1866 and in 1871 became a member of the German Empire.

SAXE-MEININGEN, mī'ning-en. A duchy and constituent State of the German Empire, in Thuringia, extending in the shape of a crescent along the northern boundary of Bavaria. Area, 953 square miles. It belongs principally to the region of the Thuringian Forest and has a hilly surface, watered by the Werra, the Saale, and some tributaries of the Main. Saxe-Meiningen is not well adapted for agriculture. The forests, which belong largely to the Crown, and public foundations cover a considerable proportion of the area and yield material for the production of woodenware. Stock-raising is unimportant. The mineral products include slate, iron, and salt. The manufacturing industries are well developed. They produce glassware, cast-iron goods, tex-

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tiles, leather, porcelain ware, etc. Saxe-Meiningen manufactures toys of papier-maché, principally at Sonneberg. There are numerous flour mills and cigar factories. The Diet consists of 24 members, of whom 4 are elected by those paying the highest land taxes, 4 by those paying the highest personal taxes, and 16 by the remaining citizens for a term of six years. Population, in 1890, 223,832; in 1900, 250,731, of whom 244,810 were Protestants. The capital is Meiningen (q.v.).

HISTORY. The line of Saxe-Meiningen was founded in 1681 by Bernhard, the third son of Ernest the Pious of Saxe-Gotha. In 1826 Duke Bernhard added to his possessions the Principality of Saalfeld and most of Hildburghausen, together with parts of Gotha and Coburg. In 1829 a constitutional form of government was established, and in 1848 a number of liberal reforms were introduced. Saxe-Meiningen became a member of the North German Confederation in 1866 and in 1871 of the German Empire.

SAXE-WEIMAR-EISENACH, vī'mär ī'zenäG. A grand duchy and constituent State of the German Empire in Thuringia, consisting of the three main divisions of Weimar, Eisenach, and Neustadt, and 24 small exclaves. Area, 1388 square miles. The District of Weimar belongs to the Thuringian highlands; that of Eisenach is touched by the Thuringian Forests on the north and the Rhön Mountains on the south; the District of Neustadt has also a more or less hilly surface. The chief rivers are the Saale and the Ilm in Weimar, the Werra in Eisenach, and the White Elster in Neustadt. Agriculture is the chief occupation. The principal crops are rye, wheat, barley, oats, potatoes, hay and fodder, and various kinds of beets. Fruit and the vine are cultivated to some extent. Stock-raising is an important industry, and the forests are exploited extensively. Industrially, Saxe-Weimar occupies a very prominent position among the minor Saxon States. Crockery and pottery and various textiles, yarns, and hosiery are exported. Other manufactures are beet sugar, leather, paper, woodenware, and footwear. The Constitution of the grand duchy dates from 1816 and is thus the oldest in Germany. The Diet is composed of 33 members, of whom 5 are returned by the landed aristocracy, 5 by those paying the highest taxes, and 23 are elected indirectly by the remaining citizens; the term is three years. The grand duchy has one vote in the Bundesrat and returns three Deputies to the Reichstag. Population, in 1890, 326,091; in 1900, 362,873, chiefly Protestants.

HISTORY. Weimar appears in the tenth century as a possession of the counts of Orlamünde, from whom it passed in 1376 to the House of Wettin. On the partition of the Wettin lands in 1485 Weimar passed to the Ernestine line. The elder line of Weimar was founded in 1572 by John William, Duke of Saxony, who died, however, in the following year. In 1603 followed the establishment of the younger line of Weimar by John, the son of John William. John died in 1605, and after a regency of some four years was succeeded by his eldest son, John Ernest, who in 1619 embraced the cause of the Elector Palatine Frederick against the Empire. (See THIRTY YEARS' WAR.) John Ernest was succeeded in 1626 by his brother William, who in 1630 made common cause with Gustavus Adolphus. William's brother, Bernhard of Weimar (q.v.), became one of the most celebrated anti-Imperialist generals of the later part of the Thirty Years' War. In 1640 William made a division of the Weimar territories with his brothers, Albert and Ernest, and is thus considered as the founder of a new line of Saxe-Weimar. The ducal lands were partitioned in 1672 among the lines of Weimar, Jena, and Eisenach, of which the two latter became extinct in 1690 and 1741, respectively, their territories being united with Weimar. Under the celebrated Amalia (q.v.), Regent for her son Charles Augustus (q.v.), and under this enlightened prince Weimar became the great centre of German literature, the home of Goethe, Herder, Schiller, and Wieland, among others. At the Congress of Vienna in 1815, Charles Augustus received the title of Grand Duke, together with an increase of territory. A constitutional government was established in 1816, and in spite of the policy of repression enforced by the Federal Diet on the German princes under the inspiration of Metternich, the government system of Saxe-Weimar continued comparatively liberal. In 1866 it joined the North German Confederation and in 1871 became a member of the German Empire.

SAXHORN. A brass wind instrument, invented by Adolph Sax in 1842. It is a successor to the ophicleide (q.v.). See MUSICAL INSTRUMENTS.

SAXIFRAGA'CEÆ. An order of plants. See SAXIFRAGE.

SAXIFRAGE (Lat. *saxifrage*, maidenhair, stone-breaking, from *saxum*, rock + *frangere*, to break; so called because supposed to break stones in the bladder), *Saxifraga*. A genus of plants of the natural order Saxifragaceæ, including about 160 species of erect or decumbent, mostly perennial, herbs, natives chiefly of mountainous tracts in north temperate and Arctic regions, sometimes at the limits of perpetual snow. The cultivated varieties, obtained from many different species, are commonly grown on rockeries. Some are densely tufted moss-like plants, which form a flowery turf. The most common wild species of the United States are early saxifrage (*Saxifraga Virginiensis*) and swamp saxifrage (*Saxifraga Pennsylvanica*) in wet ground. *Saxifraga sarmentosa*, a well-known Chinese species, is generally grown as a hanging basket plant. The cultivated varieties grow well on ordinary good soil. They are propagated by division or cutting in the spring or by seeds sown as soon as they are ripe in cold frames. Most species prefer higher ground. See Plates of SPIRÆA, ETC.; MOUNTAIN PLANTS.

TUFTED SAXIFRAGE (*Saxifraga cæspitosa*).

SAXO GRAMMAT'ICUS (Lat., Saxo the grammarian). The most celebrated of the early

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Danish chroniclers. He lived in the twelfth century and was secretary to Archbishop Absolon. He is said to have died at Roeskilde after 1208. His work is entitled *Gesta Danorum*, or *Historia Danica*, and consists of 16 books. The earlier portions are not critical, but in regard to times near his own Saxo Grammaticus is an invaluable authority. According to his own statement, he derived his knowledge of the remoter period of Danish history from old songs, runic inscriptions, and the historical notices and traditions of the Icelanders. A characteristic feature of the work is the large number of translations of early verses, most of which are preserved only in this form. The best edition of the *Historia Danica* is that undertaken by P. E. Müller, and finished by J. M. Velschov (Copenhagen, 1839). The first nine books, dealing with the heathen age, have been translated into English by O. Elton, with explanatory notes by F. York Powell, and issued by the English Folk Lore Society (London, 1892). For Saxo's treatment of the Hamlet story, see AMLETH.

SAXON ART. See ANGLO-SAXON ART.

SAXONLAND. The section of Transylvania to which large numbers of Germans migrated in the Middle Ages, and where their descendants still live.

SAXONS (Lat. *Saxones;* connected with OHG. *sahs*, AS. *seax*, archaic Eng. *sax*, knife, sword, Lat. *saxum*, rock, stone). A Germanic people who first appear in history after the beginning of the Christian Era.

The earliest mention of the Saxons is by Ptolemy in the second century A.D., at which time they appear to have dwelt in what is now Holstein. In the third and fourth centuries they pressed southward into the region of the Weser, where they encountered the Chauci and Angrivarii, who were subdued and absorbed. In the second half of the fourth century we find them breaking into the Roman dominions. By the close of the sixth century all Northwest Germany as far east as the Elbe had come to be the land of the Saxons. They invaded Britain perhaps as early as the third century; in the fifth century they occupied the coasts of Normandy. In the fifth and sixth centuries a part of the Saxons passed over into Britain, where the Jutes had already established themselves, and where they were joined by the Angles. At the beginning of the seventh century the Anglo-Saxon conquest of Britain was in a great measure completed. Pepin, King of the Franks, attacked the Saxons in Germany (the Old Saxons) successfully, and Charles the Great subdued them after fierce wars (772-804), and forced their chiefs to accept Christianity. (See CHARLES THE GREAT.) In the course of the ninth century, when under the descendants of Charles the Great a strong central power had ceased to exist in Germany, a great national Saxon duchy rose into existence. This old Duchy of Saxony was dissolved toward the close of the twelfth century, and the name of Saxony passed over to an entirely different region from that which had been the home of the Saxons. See SAXONY. Consult Hey, *Die slawischen Siedelungen im Königreich Sachsen* (Dresden, 1893).

SAXON SWITZERLAND. A mountainous district in the eastern part of Saxony (q.v.).

SAXONY. A kingdom and a State of the German Empire, bordered on the north and east by the Prussian provinces of Saxony and Silesia, on the southeast by Bohemia, on the southwest by Bavaria, and on the west by Reuss, Saxe-Weimar, Saxe-Altenburg, and Prussian Saxony (Map: Germany, E 3). It is triangular in form, with its longest side along the Austrian frontier. Its present limits were defined in 1815. Area, 5787 square miles. It is the fifth German State in size.

Saxony is a country of moderate elevations. The highlands of the southeast merge very gradually into the plains of the north. Over half of the total surface is arable. Along the Bohemian frontier are the important Erzgebirge, with the Elster Mountains at the southern apex of the country and the granite Lusatian group at the extreme eastern corner. On the northwest the slope is to the plain of Leipzig from a second and parallel range extending from the southwest to the vicinity of Döbeln in the northeast. The highest peak of Saxony is in the Erzgebirge—the Fichtelberg (about 4000 feet), rising south of Chemnitz. The Elbe River enters near the eastern end of the Erzgebirge, and here is found the famous district known as Saxon Switzerland. Its low but picturesque heights of the Elbsandstein (sandstone) Mountains, with their wonderful castellated rock formations, its forests of pine, and the narrow curving river valley form a region of great beauty. The Elbe, the only great commercial waterway of Saxony, traverses the kingdom in a northwestern direction. The Mulde flows north through the northwestern part. There are no lakes. The climate is on the whole moderate, agreeable, and favorable to agriculture. The rainfall is abundant. The precipitation is principally in the summer months.

Saxony has long been celebrated for its rich silver mines at Freiberg. They were discovered in the twelfth century. Coal, mostly lignite, is abundant in the Plauen region. Iron, lead, and tin, besides other minerals, as well as marble and precious stones, are mined. There are numerous mineral spring resorts, Bad Elster being the best known. About one-fourth of Saxony is covered with forests, nearly half of the forest area being owned by the State. About 90 per cent. of the trees are conifers. The annual income from the forest lands is large. Of the population approximately one-fifth are engaged in agriculture and stock-raising. Rye, oats, potatoes, and hay have the largest acreages. Fruit-raising latterly has greatly increased in importance. Sheep-raising and the quality of the wool have both seriously declined. Horse-breeding is still important. In 1900 there were 688,953 cattle, 166,730 horses, 74,628 sheep, 139,796 goats, and 576,953 swine.

Saxony has long been a famous manufacturing country. About one-fourth of the population is connected with the manufacturing interests, which are still increasing as compared with the agricultural. The most extensive and highly developed branch of manufacturing is the manufacture of textiles. Linens, cottons, woolens, silks, worsteds, muslins, hosiery, laces, embroideries, damask, ticking, clothing, furniture, paper of all kinds, smoking pipes, famous watches, cutlery, glass, steam machinery, and pianos may be mentioned among the prominent manufactures. The celebrated Meissen or Saxon porcelain is produced at the State Porcelain Factory at Meissen. Saxony makes famous glassware, and originated the

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art of tin-plating. The printing of books and maps is carried on on a vast scale. The serpentine stone industry employs many hands. The sugar manufactories (the first dating from 1883) have increased greatly in importance. The chocolate shipments are large. Milling and smelting are important industries. Since the Middle Ages, when the great fairs of Leipzig were founded, and it shared in the immense trade from the Levant, Saxony has been important in the commerce of mid-Europe. . It is the centre of the transit trade of mid-Germany, and the book trade of Leipzig leads the world. Saxony is a heavy shipper to the United States, especially in textiles, leather goods, and musical instruments. The Elbe and other streams are canalized and transport an enormous amount of freight. All the classes of institutions for furthering and protecting the industrial interests are adequately developed and represent a highly complicated and effective system of industrialism and finance.

The government is a constitutional, hereditary monarchy, under the Constitution of 1831, which has frequently been modified. The Ministry of State, which shares the executive power with the King, is composed of six Ministers representing Finance, War, Interior, Justice, Foreign Affairs, and Public Instruction. There are two Chambers. The first corresponds to a Senate and is composed of princes and persons occupying high positions both religious and secular. Its president is named by the King. The Lower House contains 82 members, indirectly elected. Thirty-seven are from towns and 45 from the rural communities. Dresden is the capital. Saxony has four votes in the Bundesrat and sends 23 members to the Reichstag.

The budget covering 1902 and 1903 balanced at about $68,500,000, including about $17,500,000 of extraordinary expenses (i.e. for public works). The State railways contribute most largely to the revenues, the direct taxes next. The public debt in 1902 amounted to $245,000,000. The total public property was valued at $337,000,000. The property consists chiefly of railways (1900 miles) and forest lands. The King's annual civil list is nearly $900,000.

The population in 1900 was 4,202,216—an increase of about 11 per cent. over 1895. Saxony is the third German State in population. The density is high—72.6 per square mile. The inhabitants are nearly all Lutheran Evangelicals, but the Court for the last two hundred years has been Catholic. The educational system is of the most complete order. The university at Leipzig stands at its head. In Dresden is the royal technical high school, and at Freiberg is the most famous mining academy in the world. Leipzig has a celebrated royal conservatory of music, and Dresden has also a royal music school. Saxony is famous for its art collections, libraries, museums, associations for the advancement of knowledge, and its Dresden Opera, for more particular mention of all of which see DRESDEN and LEIPZIG.

HISTORY. Saxony was the name originally given to the country which was the home of the great Lower German stock (see SAXONS), extending from the Eider River and the Zuyder Zee to where Cassel and Magdeburg are now.

Charles the Great, King of the Franks, began the conquest of the Saxons in 772. Their great leader Widukind (Wittekind) submitted and accepted baptism in 785, but their subjugation was not complete until 804. By forcing a large number of Saxons to settle in different parts of his dominions, and by colonizing their territories with Frank settlers, Charles the Great succeeded in incorporating them into his own empire. A number of bishoprics were erected by Charles and his immediate successors in the Saxon land, which was soon Christianized. By the Treaty of Verdun (843) the country was given to Louis the German. The people were so harassed by Slavs and Northmen that powerful marks (see MARK) were created for the purpose of protection. Ludolf was appointed first Duke (Herzog) of a mark on the west side of the Elbe, and he and his descendants gradually extended their power over the whole of Saxony. This was the original of the old national Saxon Duchy. Ludolf was succeeded by his son Bruno, who was followed by Otto the Illustrious (d. 912), who added Thuringia to the duchy. His son Henry, surnamed the Fowler (912-936), was elected King of Germany in 919, founding a dynasty which ruled Germany until its extinction in 1024.

Henry the Fowler created the Schleswig Mark, to protect the country from the Danes. He also conquered the tribes between the Elbe and the Oder, creating the East Mark, which he protected by strongly fortified castles and border towns. Furthermore, the country which later became the powerful Mark of Brandenburg under Albert the Bear was conquered. Henry was succeeded by his son Otho I. the Great, whose coronation by the Pope at Rome in 962 inaugurated the Holy Roman Empire of the German Nation. Otho had to wage continuous war against his rebellious nobles, and to gain support gave the Duchy of Saxony in 960 to his loyal follower, Hermann Billung. When the duchy lapsed with the death of Magnus, the last of the Billungs, in 1106, Henry V. gave the duchy to Lothair, Count of Supplinburg, one of the most powerful German princes, who ascended the Imperial throne in 1125, with the aid of the Papal party. In 1127 he gave the Duchy of Saxony to his son-in-law, Henry the Proud, Duke of Bavaria, of the House of Guelph, who also inherited extensive private possessions in Saxony through his mother, a member of the Billung family. The Emperor Conrad III., of the House of Hohenstaufen, would not allow Henry to have the two duchies and bestowed the Saxon Duchy on Albert the Bear, who in 1134 had received the North Mark. During the strife which ensued Henry died. In the meantime the Saxons had revolted against Albert. After Henry's death the Emperor took away the duchy from Albert, bestowing it in 1142 on Henry the Lion (q.v.), the young son of Henry the Proud. Albert was allowed to rule the Mark of Brandenburg, which was composed of the North Mark and a part of the East Mark, as an independent State.

Henry the Lion at this time had almost royal possessions. But his insolent and defiant attitude toward the Emperor Frederick Barbarossa brought about his downfall (1180-81) and the dissolution of the old Saxon Duchy. To Bernhard of Ascania, son of Albert the Bear, was given the title of Duke of Saxony and a small district between the Elbe and the Weser, while the rest of the great duchy was divided among powerful bishops and princes. Henry was allowed to

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keep only Brunswick and Lüneburg. Anhalt and Wittenberg also belonged to Bernhard, and when his two grandsons, John II. and Albert, divided their possessions in 1260, they created two small duchies of Saxe-Lauenburg and Saxe-Wittenberg. The capital of the latter, Wittenberg, was entirely outside of the old duchy. Both duchies claimed the electoral privilege, including the office of grand marshal; but in 1356 the Golden Bull confirmed the claims of Wittenberg. The Ascanian line became extinct in 1422 with Albert III. In 1423 the Emperor Sigismund conferred the Duchy of Saxe-Wittenberg, together with the electoral dignity, on Frederick the Warlike, Margrave of Meissen, of the House of Wettin, in consideration of aid received in wars waged against the Hussites. The name of Saxony was gradually extended to the Mark of Meissen and the other old possessions of the House of Wettin, and thus came to denote a very different region from the old Saxon Duchy.

Frederick the Warlike was descended from Henry of Eilenburg, who had received the Mark of Meissen in 1089. In 1123 Meissen passed to Conrad of Wettin. He divided the lands among his sons, and their descendants followed the same policy. Under Margrave Otho the Rich (1156-90) the Leipzig fairs were established. One of his descendants, Henry the Illustrious (1221-88), inherited Thuringia. In the fourteenth century the Pleissnerland (including Altenburg, Zwickau, and Chemnitz) became a possession of Meissen. In 1381 Frederick the Warlike became Margrave. His successor was his son, Frederick II., the Gentle (1428-64), who gained some territory, but in 1445 began a destructive civil war between Frederick and his brother William for the possession of Thuringia. It was ended in 1451.

Frederick II. was succeeded by his two sons, Ernst (1464-86) and Albert (1464-1500), who, in accordance with the will of their father, reigned conjointly over the hereditary domains of the family; but in 1485 the territories were divided, most of Thuringia, the Electoral Duchy of Saxony, and other territories, with the electoral dignity, going to the Ernestine or elder line, which still rules in the Saxon duchies, and Meissen and other territories (including the city of Leipzig) to the Albertine line, which survives in the Kingdom of Saxony. Wittenberg was the capital of the electoral line, while Dresden became the capital of the Albertine or ducal line. Ernst was succeeded by his son, Frederick the Wise (1486-1525), the friend and protector of Martin Luther, and one of the most influential of the German princes. His brother and successor, John the Constant (1525-32), was still more a partisan of the reformed doctrines, as was also John's son and successor, John Frederick the Magnanimous (1532-47). The latter and Philip, Landgrave of Hesse, were at the head of the League of Schmalkald in the disastrous war waged against the Emperor Charles V. (1546-47). Through the defeat at Mühlberg (q.v.) John Frederick lost his electoral dignity and the bulk of his dominions, which were transferred to the Albertine line. The Thuringian territories alone were left to the Ernestine princes. See SAXE-WEIMAR, SAXE-EISENACH, SAXE-COBURG-GOTHA, etc.

Albert, the founder of the younger, ducal, or Albertine line, was succeeded by his sons, George the Bearded (1500-39) and Henry the Pious (1539-41), a zealous Protestant, after whom came the celebrated Maurice (1541-53), who, though a Protestant, gave his aid to the Emperor against the League of Schmalkald, and was rewarded with the electoral title and the greater portion of the estates of his vanquished cousin. He afterwards turned against the Emperor and secured the triumph of Lutheranism in Germany. Maurice's brother Augustus (1553-86) established numerous excellent institutions and considerably increased his territories by purchase and otherwise. Christian I. (1586-91), a weak prince, surrendered the reins of government to his chancellor, Crell, who was sacrificed, in the succeeding reign of Christian II. (1591-1611), to the vengeance of the offended nobility. John George I. (1611-56) fought on the side of Austria at the beginning of the Thirty Years' War (q.v.), was afterwards forced into a half-hearted alliance with Gustavus Adolphus (1631), and in 1635 concluded a separate peace with Austria by which he obtained Upper and Lower Lusatia.

From the time of the Thirty Years' War Saxony ceased to be the leading Protestant State in Germany, its power being overshadowed by that of Brandenburg. John George's sons, John George II. (1656-80), Augustus, Christian, and Maurice, divided the paternal estates, the three latter founding cadet lines, all of which became extinct before 1750. The reigns of John George III. (1680-91) and John George IV. (1691-94) are unimportant. That of Frederick Augustus I., known as Augustus the Strong (1694-1733), well-nigh ruined the hitherto prosperous electorate. (See AUGUSTUS I.) Frederick Augustus was chosen King of Poland in 1697, embracing Catholicism, which remained the religion of his successors. His attempt with Peter the Great and the King of Denmark to dismember Sweden brought down upon him and his two States the vengeance of Charles XII. (q.v.). Poland was devastated and Saxony exhausted of money and troops. The King's habits were most extravagant, and to maintain his lavish magnificence he sold important portions of territory. Frederick Augustus II. (1733-63) contended with Stanislas Leszczynski (q.v.) for the Polish throne, being recognized as King in 1735. He plunged Saxony into the War of the Austrian Succession (see SUCCESSION WARS) and into the Seven Years' War (q.v.), and a long time elapsed before it recovered prosperity. (See AUGUSTUS II.; BRÜHL.) Frederick Augustus (1763-1827) joined Prussia against Napoleon in 1806, his army participating in the disastrous battle of Jena. The pressure of the French compelled him to join the Confederation of the Rhine in 1806; at the same time he assumed the kingly title as Frederick Augustus I. (q.v.). He became the ally of Napoleon, who, after the Peace of Tilsit in 1807, conferred upon him the newly created Duchy of Warsaw (see POLAND); and the Saxon troops fought at Wagram, in Russia, and at Leipzig. After the overthrow of Napoleon at Leipzig (October, 1813) he was for a time a prisoner in the hands of the allies, and the Congress of Vienna (1814-15) deprived him of more than half of Saxony, which was handed over to Prussia, although he was allowed to retain the title of King. He did much for the internal welfare of his country.

Anthony (1827-36) reformed the entire legis-

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lative system of the kingdom, and granted a liberal constitution, being urged thereto by a popular outbreak in the autumn of 1831. His nephew, Frederick Augustus II. (1836-54), who had been Regent for several years, succeeded, but, though he was favorable to constitutionalism, the new system did not work well. In 1849 there was an insurrection in Dresden, which was suppressed by Prussian arms. Toward the close of the King's reign he was a mere tool in the hands of the reactionary party, headed by his brother John, who succeeded him in 1854. John's policy was guided by Count Beust (q.v.), Prussia's inveterate enemy, and Saxony was kept in line against Bismarck's policy. She joined Austria in the Seven Weeks' War (q.v.), shared in the defeat of Sadowa, and was compelled to join the North German Confederation (1866). In 1871 Saxony became a member of the new German Empire. John was succeeded October 29, 1873, by his son Albert.

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SAXONY. A province of Prussia, bounded by Hanover and Brunswick on the north, Brandenburg and Silesia on the east, the Kingdom of Saxony and the Thuringian States on the south, and Hesse-Nassau, Hanover, and Brunswick on the west (Map: Prussia, D 2). It it broken up by numerous enclaves belonging to other provinces. It covers an area of 9750 square miles. The surface is level in the north, while the western and southern parts belong to the region of the Harz Mountains and the Thuringian Forest. It is watered chiefly by the Elbe with its tributary the Saale and several tributaries of the Weser, most of them navigable. Saxony is one of the most fertile, and agriculturally the best developed, parts of the German Empire. Its chief crops are rye, wheat, oats, barley, and sugar beets. Tobacco and the vine are also cultivated to some extent. Gardening is carried on extensively and the yield of fruit is very considerable. The raising of domestic animals, and especially sheep, is also very important. There are rich deposits of lignite and rock salt, and iron, copper, silver, and nickel are found. There are manufactures of metalware, arms, machines, tools, etc. Chemical works, woolen and linen mills, tanneries, paper and sugar mills, shoe factories, and distilleries are prominent. The centres of commercial activity are Magdeburg and Halle. Administratively the province is divided into the three districts of Magdeburg, Merseburg, and Erfurt. The capital is Magdeburg. In the Prussian Landtag the province is represented by 38 delegates in the Lower and 30 members in the Upper Chamber, while to the German Reichstag it returns 20 members. Population, in 1900, 2,833,224, chiefly Protestants. The province was formed in 1815.

SAXOPHONE (from *Sax* + Gk. *φωνή*, *phōnē*, sound, voice). A musical instrument invented about 1840 by Adolphe Sax. It consists of a conical brass tube, having about twenty lateral orifices covered by keys, and it is played by means of a mouthpiece and a simple reed, like the clarinet. The compass of the various instruments of this family extends over five octaves from $_1A$ to a^3. The music for all, even the lower saxophones, is written in the treble clef.

SAXTON, JOSEPH (1799-1873). An American inventor, born at Huntingdon, Pa. He received a common school education, and at an early age made improvements in nail-making machinery. He went to Philadelphia in 1817, and while there invented a machine for cutting the teeth of chronometer wheels, and an escapement and compensating pendulum for clocks, and constructed a clock for the steeple of Independence Hall. He went to London in 1828, and resided there nine years, enjoying the acquaintance of Faraday. On his return to Philadelphia he superintended the making of machinery for the United States Mint, and afterwards had charge of the construction of standard weights and measures, accurate sets of which he furnished to National and State governments. Among his ingenious contrivances may be mentioned the mirror comparator for comparing standard measures, and a new form of machine for dividing them; the deep-sea thermometer, used by the United States Coast Survey in exploring the Gulf Stream; the self-registering tide gauge, and the immersed hydrometer.

SAY, sâ, JEAN BAPTISTE (1767-1832). An eminent French economist, born at Lyons. His father intended him for business life and gave him some experience in England. In 1790 he took up the profession of journalism, and in 1794 became editor of the *Décade philosophique littéraire et politique*. In 1799 he was called to the tribunate by Napoleon, and was assigned to the Committee of Finance. In 1803 he published the first edition of his *Traité d'économie politique*. Its views on finance displeased Napoleon, and as the author was unwilling to modify them his retirement to private life followed. In 1819 he became professor of industrial economy at the Conservatoire des Arts et Métiers, and in 1830 professor of political economy at the Collège de France. He died November 15, 1832.

Say may properly be regarded as a popularizer of the work of Adam Smith. While he cannot be classed with him and Ricardo as an original thinker, he made some important contributions to economic theory, among them the familiar division of the science into Production, Distribution, and Consumption, the theory of the productivity of capital, and the distinction between profits and interests. In his advocacy of free trade he went beyond Adam Smith. His work exercised a wide influence, not only in France, but in other countries as well.

SAY, LÉON (1826-96). A French economist. He was a grandson of Jean Baptiste Say, and came into prominence through his connection with the *Journal des Débats*, exercising a great influence on the financial administration of the country. In 1871 Say was made prefect of the Department of the Seine and the next year Minister of Finance. Six times thereafter he held the financial portfolio. He presided over the international monetary conference at Paris in 1879, and was sent to London in 1880 as ambassador to nego-

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tiate a treaty of commerce, but failed. A large part of the remainder of his life was spent in one House or the other of the French Legislature. Say was a very prolific writer on financial subjects. A comprehensive *Dictionnaire des finances*, a standard authority upon French financial practice and history, was published under his supervision. His work, *Les finances de la France* (1883), in four volumes, gathers together his various expositions of financial questions arising during a long parliamentary career. He wrote also: *Histoire de la caisse d'escompte* (1848); *Rapport sur le payement de l'indemnité de guerre* (1874); *Les solutions démocratiques de la question d'impôts* (1886); *Turgot* (1887); *David Hume* (1888); *Cobden* (1891).

SAY, THOMAS (1787-1834). An American zoölogist, born in Philadelphia. In 1812 he became one of the founders of the Academy of Natural Sciences in Philadelphia and its first curator. In 1818 he took part in a scientific exploration of Georgia and Florida, and in 1819-20 he was zoölogist to Long's expedition to the Rocky Mountains. Say was a collector of insects and mollusks, and his works describing them were the beginnings of the sciences of entomology and conchology in America. His larger works were: *Vocabularies of Indian Languages* (1822); *American Entomology* (1824-28); *American Conchology* (1830-34). He became interested in, and after 1825 a member of the Socialistic community at New Harmony, Ind., where he died.

SAYAN. See CHAY ROOT.

SĀYAṆA, sā'yā-nā (?-1387). A Sanskrit commentator, who flourished at the courts of Sangama II. and Harihara II., kings of Vijayanagara, the modern Hampi on the Tungabnadra, in the Bellary district of Madras. He terms himself also the teacher and minister of Bukka I. (1379-99) of the same line. Between 1331 and 1386 Sayana was abbot of the monastery of Sringiri. Although few details of his life are known, it is clear that he belonged to a family of importance both in political and in religious circles. By far the most important work of Sayana was his commentary on the Rig-Veda. Internal evidence shows that this, like several other commentaries ascribed to him, was only partly his, and that his incompleted work was finished by the school of commentators which he founded. The varying estimates given to this gloss have formed one of the hardest problems of Vedic interpretation. (See VEDA.) The 'traditional' school accepted Sayana as its guide. Herein the 'traditionalists' were in sharp conflict with the 'linguistic' or philological school. The safest plan seems to be a combination of the two methods, so that the results of comparative philology and of tradition serve as a mutual check. This commentary has been admirably edited by Max Müller in his *Rig-Veda-Samhitā* (2d ed., 4 vols., Oxford, 1890-92). Besides this there is a long list of works attributed either to Sayana or to his brother Madhava, who was also called Vidyaranya. In his commentaries he devoted himself almost exclusively to texts of the Vedas, Brahmanas, Upanishads, and other early religious texts. Comparatively few of his works have been published, although his commentary on the *Atharva* is printed in an edition of this Veda by Pandit (Bombay, 1895), that on the *Āitarēya Āraṇyaka* by Agase (Poona, 1896), on the *Sāma Vēda* by Samasrami (Calcutta, 1874-76), on the *Taṇḍya Mahābrāhmaṇa* by Vedantavagisa (ib., 1869-74), on the *Vaṃśabrāhmaṇa* by Burnell (Mangalore, 1873), on the *Tāittirīya Āraṇyaka* and on the *Tāittirīya Brāhmaṇa*, by Apte (Poona, 1897-98). A list of the works attributed to Sayana is given by Aufrecht, *Catalogus Catalogorum* (Leipzig, 1891-1903).

SAY'BROOK. A town in Middlesex County, Conn., 19 miles west by south of New London, on the New York, New Haven and Hartford Railroad (Map: Connecticut, F 4). Population, in 1900, 1634. In 1635 a small fort was built in what is now Old Saybrook, and during the Pequot War was commanded by Lion Gardiner. In 1639 George Fenwick, as agent for the Connecticut patentees, settled here and named the place in honor of Lord Say and Sele and Lord Brooke, the two most influential men in the company represented by him. For six years Saybrook was an independent colony, but in December, 1644, Fenwick ceded the settlement and the land in its vicinity to the Connecticut colony, receiving in return, for ten years, the proceeds from taxes levied on the domestic trade in beaver, and from a tax levied on live stock, and duties collected on such corn and biscuit as were carried out of the river. The amount thus paid has been estimated at £1600. Saybrook was the early home of Yale College, which remained here until removed to New Haven in 1716. In 1708 the celebrated Saybrook Platform, for Church government, was adopted here. Saybrook formerly included the towns of Old Saybrook, Westbrook, Essex, Chester, and part of Lynn.

SAYBROOK PLATFORM. A name given to certain articles adopted by a synod consisting of twelve ministers and four laymen, representing the churches of Connecticut, which met at Saybrook, September 9, 1708. The articles provided that the churches of the colony should be grouped in 'consociations' or standing councils, by which questions of discipline and church matters such as the installation and dismissal of ministers should be decided. Ministers were grouped in associations and an annual 'general association' was provided. The articles were approved by the Legislature and carried into effect in 1709. They remained the legally recognized standard till 1784.

SAYCE, sās, ARCHIBALD HENRY (1846—). An English Orientalist. He was born at Shirehampton, and graduated at Queen's College, Oxford, where he became fellow in 1869. From 1874 to 1884 he was a member of the Old Testament Company of the Bible Revision Committee. From 1876 to 1890 he was deputy professor of comparative philology at Oxford and became professor of Assyriology in 1891. Professor Sayce is an exceedingly fertile writer, whose activity covers a large range of subjects—Assyriology, Oriental history, biblical criticism, the Hittites, comparative philology, and general archæology. Through his popular books he has become widely known to the general public. Among his works may be mentioned: *An Assyrian Grammar for Comparative Purposes* (1872); *The Principles of Comparative Philology* (1874); *Introduction to the Science of Language* (1879; 4th ed. 1900); *The Monuments of the Hittites* (1881); *The Ancient Em-*

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pires of the East (1884); *Assyria* (1885); the Hibbert Lectures on *Babylonian Religion* (1887); *The Races of the Old Testament* (1891); *The Higher Criticism and the Verdict of the Monuments* (1894); *Patriarchal Palestine* (1895). He also edited the *Records of the Past*, 2d series (1888-92).

SAYRE, sâr. A borough in Bradford County, Pa., 59 miles northwest of Scranton, on the Susquehanna River, and at the terminus of a division of the Lehigh Valley Railroad (Map: Pennsylvania, E 2). It has the R. A. Packer Hospital. There are shops of the Lehigh Valley Railroad, wheel and foundry works, metal works, a picture-frame factory, a foundry, and manufactories of various iron products. Sayre was settled in 1840, and received its present charter in 1891. Population, in 1900, 5243.

SAYRE, Lewis Albert (1820-1900). An American surgeon, born at Madison, N. J. He graduated at the College of Physicians and Surgeons in New York in 1842, and during the following ten years was prosector in surgery there. He was also for many years connected with Bellevue Hospital and the Charity Hospital on Blackwell's Island. He published *Practical Manual of the Treatment of Club-Foot; Lectures on Orthopædic Surgery;* and *Spinal Curvature and Its Treatment.*

SAYRE, Stephen (1734-1818). An American adventurer, born on Long Island. He was educated at the College of New Jersey, and after engaging in various pursuits went to London, where, in 1774, during the Wilkes excitement, he was elected a sheriff. Soon afterwards he was committed to the Tower on a charge of plotting to overturn the Government, but five days later was discharged on a writ of habeas corpus. During the Revolutionary War he made himself conspicuous in the capitals of Northern Europe by his activity in behalf of the United States, though he was entirely without authorization from the American Government except during a brief period when he was secretary to Arthur Lee (q.v.) in Berlin. His claims for remuneration for these services were repeatedly refused by Congress until 1807, when it allowed him a certain sum for his services in Berlin. In 1795 he became a violent opponent of Washington's administration and was especially bitter in attacking the Jay Treaty.

SCABBARD-FISH. See Cutlass-Fish; Frost-Fish.

SCABIES. See Itch; Mange.

SCABIOUS (OF., Fr. *scabieuse*, from ML. *scabiosa*, fem. sg. of Lat. *scabiosus*, rough, scaly, from *scabies*, scurf, scab; so called because regarded as a remedy for skin diseases), *Scabiosa*. A genus of herbs of the natural order Dipsacaceæ, natives of the Eastern Hemisphere. The flowers are collected in terminal heads, surrounded by a many-leaved involucre, which resembles the head of a species of Compositæ. The devil's-bit scabious (*Scabiosa Succisa*), common in European pastures, is astringent and was formerly in medicinal repute in skin eruptions. The root is very abruptly pointed, on which account Middle Age superstition regarded it as bitten off by the devil, out of envy, because of its usefulness to mankind.

SCAD (probably a variant of *shad;* less plausibly explained as from Ir., Gael. *sgadan*, herring). Any of several fishes of the family Carangidæ, or horse-mackerels; especially a small species (*Trachurus trachurus*), rare in America, but numerous and valuable on the southern coast of Europe. It is a foot long, and greenish, with silvery sides and a dusky opercular spot. (See Plate of Horse-Mackerels, etc.) The name is also applied to species of other genera of the family, especially to a small similar fish, the mackerel-scad (*Decapterus punctatus*), common along the eastern American coast, and especially about the West Indies, where also is a second species. Other names for them are 'antonino,' 'cigar-fish,' 'round-robin,' and 'quia-quia.'

SCÆVOLA, sĕv'ô-lâ, Gaius Mucius. See Porsena.

SCALA, skä'lâ, della. The name of an Italian family, whose seat was Verona, of which place the Ghibelline Mastino della Scala was elected *podestà* in 1260. He became perpetual captain of the city and Imperial vicar, and was assassinated in 1277. His successors, Alberto (d. 1301), Bartholomew (d. 1304), and Alboino (d. 1311), extended the influence of the family. The greatest of the family was Can Francesco, or Can Grande, as he was called (1291-1329), who filled his Court with sculptors and poets, preëminent among whom stands Dante, who eulogizes his patron in glowing terms in the *Paradiso*. He was a friend of Henry of Luxemburg, who appointed him Imperial vicar and head of the Ghibelline League of Lombardy. He carried on a bitter warfare with Padua and extended his power over Este, Cremona, Monselice, Feltre, Vicenza, and Treviso. Under Mastino II. (d. 1351) the family declined in influence, and in 1387 Verona came under the dominion of the Visconti.

SCABIOUS (*Scabiosa Succisa*).

SCALA, La (It., the staircase). A famous theatre in Milan, Italy, built in 1778, next in size to the San Carlo Theatre at Naples, and holding 3600 spectators.

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SCALA SANTA, sän'tà. See LATERAN, CHURCH OF SAINT JOHN.

SCALCHI, skäl'kē, SOFIA (1850—). An Italian operatic singer, born in Turin. She made her début in Mantua, in 1866, and sang in opera throughout Europe. In 1883 she made her first appearance in the United States, where she became a great favorite. Her voice, a rich contralto of extensive compass, enabled her also to sing mezzo-soprano. Her most successful rôles include Siebel in Gounod's *Faust;* Fides in Meyerbeer's *Prophète;* Amneris in Verdi's *Aïda;* Arsace in Rossini's *Semiramide;* and Pierotto in Donizetti's *Linda di Chamounix.*

SCALD-HEAD. See FAVUS.

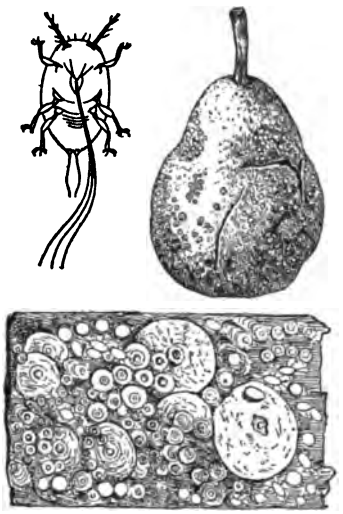
SCALDS. See BURNS AND SCALDS.

SCALE (Lat. *scala,* staircase, ladder, from *scandere,* to climb, Skt. *skand,* to spring, ascend). In music, a succession of notes arranged in the order of pitch, and comprising those sounds which may occur in a piece of music written in a given key. The scale consists of a series of seven steps leading from a given note (fixed on as the tonic or key-note) to its octave, which may be extended indefinitely up or down, so long as the sounds continue to be musical. For an explanation of the principles on which these scales are founded, and of their derivation from the harmonic triad, see MAJOR; MINOR. See also GREEK MUSIC; MODES.

SCALE INSECT (AS. *scealn, sceale,* OHG. *scala,* Ger. *Schale,* shell, husk, scale, Goth. *skalja,* tile; connected with OChurch Slav. *skolika,* mussel, Russ. *skala,* bark, shell, Lith. *skelti,* to split; probably connected ultimately with Eng. *shell*). Any insect of the family Coccidæ (q.v.), sometimes also called 'scale-bug,' or 'bark-louse.' The scale insects are distinguished from their nearest allies by the absence of wings in the females, by the possession of only two wings in the males, by the absence of any mouth or feeding apparatus in the adult males, which, instead, are usually supplied with large supplementary eyes. Further, in both sexes the legs (when present) terminate in a single claw at the tip of a single-jointed tarsus. The group is now divided into twelve subfamilies, which are distinguished as follows: The true scale-bearers belong to the subfamilies Conchaspinæ and Diaspinæ, the scale in the former group being composed of secreted matter, in the latter cast skins and secreted matter together. The so-called 'naked' scales compose the ten other subfamilies, nearly all the species of which secrete some substance which more or less disguises them. The subfamilies are more or less characterized as follows: Dactylopiinæ (mealy bugs, q.v.), covered with a white, waxy, powdery secretion which sometimes forms long, apparently fibrous bundles; Lecaniinæ proper, a cleft posterior extremity in the female; Hemicoccinæ, larvæ with abdominal lobes; Tachardiinæ, lac insects (see LAC), inclosed in a resinous cell with three orifices; Coccinæ, no anal tubercles in the female; Idiococcinæ, short antennæ; Brachyscelinæ, gall-making coccids. In each of these subfamilies the males have simple eyes; in the Ortheziinæ and Monophlebinæ they have compound eyes. The last-named group, mainly Australian, contains the largest species, some of which are more than an inch long.

The scale insects live upon the sap of plants, and with few exceptions are considered pests. (See SAN JOSÉ SCALE; OYSTER-SHELL BARK-LOUSE; ORANGE INSECTS.) Since they are insignificant in appearance and are attached to all parts of the plant, some of them have spread upon nursery stock and fruit and have become cosmopolitan in their distribution. With many the original home is a matter of doubt.

Among the most notable American scale insects are the following: Cottony cushion scale (*Icerya Purchasi*), once troublesome in California, but subdued by a ladybird (*Novius cardinalis*) imported from Australia (see LADYBIRD); species of the genus Kermes, remarkable for the gall-like form of the adult females, which closely re-



SAN JOSÉ SCALE.

A young larva; a pear covered with scale insects; and the scales, enlarged.

semble small oak galls; cottony maple scale (*Pulvinaria innumerabilis*), a brown naked scale which secretes a large, white, waxy, unribbed egg-mass; black scale of the orange and olive (*Lecanium oleæ*), a cosmopolitan species, troublesome in California; hemispherical scale (*Lecanium hemisphæricum*), a common greenhouse pest throughout the world, living out of doors upon citrus trees in the Gulf States. Of the true armored scales, aside from those mentioned, there are the scurfy bark-louse of the apple (*Chionaspis furfurus*); pine-leaf scale (*Chionaspis pinifoliæ*); and the common rose scale (*Diaspis rosæ*), all of which are often troublesome upon their host plants. Most scale insects are oviparous. Certain species, however, are viviparous, and some must be parthenogenetic. With one species, the common 'flat' scale (*Lecanium hesperidum*), which is cosmopolitan and a frequent denizen of hothouses, the male has never been found, although the females occur in incalculable numbers.

REMEDIES FOR SCALE INSECTS. In temperate regions, with those species which hibernate in the egg stage, scale insects can usually be controlled by spraying the plants with kerosene emulsion in the early spring as soon as the young have hatched, the young insects being unprotected by a scaly covering. With species which hibernate in the adult or half-grown condition protected by the scale, and which give birth to young at irregular and prolonged periods, pure kerosene and crude petroleum may be lightly

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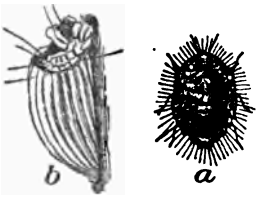
sprayed upon dormant fruit trees, generally in the bright sunlight, when evaporation will be so speedy that the trees will remain uninjured. Many treatments of this kind have been successful, but others have resulted in the loss of valuable trees. Petroleum and water mixed by specially devised pumps has been effective. A mixture of unslaked lime (30 pounds), sulphur (20 pounds), and salt (15 pounds) has been successful in California against armored scales, and in portions of the East also. The ingredients are placed together in a barrel with thirty or forty gallons of water and boiled with steam for three or four hours. The mixture should be diluted to sixty gallons and should preferably be applied hot. It leaves a limy coating which acts as a deterrent to the young scales, and when not washed off by rains it retains its value for several weeks. Whale-oil or fish-oil soap, preferably made with potash lye, is dissolved in water by boiling at the rate of two pounds of soap to a gallon of water, and makes an excellent winter wash for armored scales. If applied hot and on a warm day in winter it can easily be put on trees with an ordinary spray pump. On a cold day, however, it will clog. Many of the States have passed laws to prevent the introduction of nursery stock unless accompanied by a certificate from a State official or a recognized expert that it has been inspected and found free from scale insects, or unless it has been fumigated with hydrocyanic acid gas. To perform this fumigation at a nursery a small air-tight fumigation house is usually constructed. See INSECTICIDE.



FLUTED SCALE.
a, full-grown female; b, same, after secretion of fluted egg-sac.

Consult: Green, *Coccidæ of Ceylon* (London, 1896-90); Comstock, *Manual for the Study of Insects* (Ithaca, 1895); Howard, *The Insect Book* (New York, 1902); Cockerell, "Tables for the Determination of the Genera of Coccidæ," in the *Canadian Entomologist* (London, Ont., 1899); Marlatt, *Farmers' Bulletin No. 127, United States Department of Agriculture* (Washington, 1901); Marlatt, *Circular 42, second series* (ib., 1902).

SCALES. Small plates arising from the skin and forming the covering or armature of the bodies of various animals, as fishes, lizards, snakes, and a few mammals. In fishes they are present in most forms as calcified plates in the skin, which may be so minute as to be almost microscopic, or in the form of large plates. Agassiz classified scales into placoid, ganoid, ctenoid, and cycloid, and classified fishes into these four groups. The most primitive scales, found in the elasmobranchs, consist of a basal plate of dentine bearing a central spine, covered externally by an enamel coat. The former is derived from the derma and the enamel is secreted by the epidermis. These are the placoid scales, and they show a great similarity in their structure and development to teeth (q.v.). In ganoid scales the basal portion is formed as in placoid scales and is covered by a coating of smooth, hard substance called ganoin. These are generally of a rhomboid form, as in the garpike (Lepidosteus). Both ctenoid and cycloid scales may occur within the same family, or even smaller group, so that their lack of importance as characters upon which to base a classification must be conceded. Among the Amphibia more or less calcified or ossified scales are entirely restricted to the Stegocephali and Apoda. Those of the former group (which is extinct) were small and partly calcified or perhaps ossified, "and we can only surmise," says Gadow, "that these scales were covered by corresponding dermal sheaths." The modern cæcilians have a partial scale-armature which consists of calcareous cell-secretions, and is consequently an entirely mesodermal product of the deeper layers of the cutis. (See MOLTING.) Reptiles have from the earliest times been characterized by their coating of scales in most groups. The term in its ordinary sense, however, applies mainly to the covering of modern lizards and snakes. The scales of these creatures are formed by the cutis, and have a horny epidermal covering, which peels off periodically when the skin is 'shed.' In some lizards they are nearly absent; in many they contain 'osteoderms' or ossified portions of the cutis, over a part or all of the body. Snakes never have osteoderms. Well-developed scales overlap, but in some cases lie flat, edge to edge.

In birds, where a semblance of scales appears, as in the penguins, they are to be accounted for as modified feathers; and in scaly mammals, such as the manis and the scale-tailed squirrel (Anomalurus), the scales are formed of agglutinated hairs.

SCALES OF NOTATION. Systems for writing numbers have been formed with various bases; those known to have been used by civilized or semi-civilized peoples are chiefly the *quinary* (scale of 5), *denary* (scale of 10), *duodecimal* (scale of 12), *vicenary* (scale of 20), and *sexagesimal* (scale of 60) systems. The *binary system* (scale of 2) was advocated by Leibnitz for scientific purposes. Such a system requires only the figures 0, 1, and reduces the fundamental operations to addition and subtraction. But these advantages are offset by the excessive repetitions of the digits to express ordinary numbers. Thus 289 is expressed in the binary scale 100,100,001. The *ternary* and *quaternary* systems, the latter of which is known to have been used by certain savage tribes, are open to the same objection. The quinary system (scale of 5) probably originated in the practice of finger reckoning. (See FINGER SYMBOLISM.) It is known to have been used by many savage tribes, especially among the primitive South Americans and probably among the early Russians. The *senary* system (scale of 6), *septenary* (scale of 7), *octary* (scale of 8), and *nonary* (scale of 9) may be said to exist in theory only. The denary scale as a system of numeration is practically co-extensive with civilization. It, like the quinary scale, doubtless originated in the finger reckoning of primitive peoples. This system owes its popularity largely to the simplicity and power of the Hindu notation. The base 12 of the duodecimal scale may have been suggested by the twelve lunations in the solar year. Its popularity among the Romans is well attested, and the dozen, gross, shilling, foot, and

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pound are evidences of its longevity. The notation for such a system would evidently require 12 figures and possess peculiar advantages. Thus, $\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{4}$, $\frac{1}{6}$ of 12 units are all integral, while $\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{4}$ of 10 units are not. For manipulation and direct measurement which depend upon the convenient graduation of the measuring scale the duodecimal system is convenient, but for the other purposes of calculation the decimal scale is superior. The primitive Scandinavians, the Caribbees, and the Mexicans seem to have used the scale of 20. The sexagesimal system (scale of 60) was undoubtedly originated by the Babylonian priests for astronomical calculations. Perhaps the Babylonians also divided their days into 60 equal parts, as is found in the Veda calendars of the ancient Hindus. This system was also used among the Greeks, having been introduced by Hipparchus.

For the history of various scales, consult: Tylor, *Primitive Culture* (London, 1871); Conant, *The Number Concept* (New York, 1896), and the bibliographies there given. For doubts as to the commonly accepted origin of the sexagesimal system, consult Sayce and Bosanquet, "Babylonian Astronomy," in the *Monthly Notices of the Royal Astronomical Society* (1880, vol. xl., No. 3).

SCALIGER, JOSEPH JUSTUS (1540-1609). A celebrated French scholar, the tenth child of Julius Cæsar Scaliger, born August 4, 1540, at Agen, in Guienne, whence at the age of twelve he was sent to the college of Bordeaux. A pestilence breaking out in Bordeaux, he was recalled by his father, who put him under a narrow but rigorous classical training, under which he attained great proficiency as a Latinist; and in his nineteenth year, on the death of his father, he went to Paris, where he studied Greek under the famous Turnebus. He was less indebted, however, to any master than to himself; and finding that his progress was slow under his great preceptor, he closeted himself alone with Homer, and in 21 days read him through, with the aid of a Latin translation, and committed him to memory. In less than four months he mastered all the Greek poets. Hebrew, Syriac, Persian, and most of the modern European languages were acquired in rapid succession. He was a professor at Geneva, 1572-74; became a Protestant, and was thus cut off from any considerable appointment in France. Except that he traveled a good deal, and visited the chief universities of France and Germany, and even found his way to Scotland, we know little of his life up to 1593. In that year he was invited to succeed Lipsius in the chair of literature at the University of Leyden, where he spent the rest of his life. He died January 21, 1609, recognized as the leading scholar in Europe. He was a man of immense vigor of understanding and must be credited with having been the first to lay down in his treatise *De Emendatione Temporum* (Paris, 1583) a complete system of chronology formed upon fixed principles. It was this achievement that secured for him the title of father of chronological science. It was subjected to much emendatory criticism by critics like Petavius, and also by himself, its errors having been partly corrected by him in his later work, the *Thesaurus Temporum* (Amsterdam, 1658). Among the classical authors whom he criticised and annotated are Theocritus, Seneca (the tragedies), Varro, Ausonius, Catullus, Tibullus, Propertius, Manilius, and Festus. His other works are: *De Tribus Sectis Judæorum; Poemata; Epistolæ;* a translation into Latin of Arabian proverbs, etc. Interesting notices of him are preserved in the two volumes of *Scaligerana*, which embody his conversations. Consult: Bernay, *Joseph Justus Scaliger* (Berlin, 1855), with a list of his works; Mark Pattison, "The Lives of the Two Scaligers," in *Essays, ed. by Nettleship* (Oxford, 1889).

SCALIGER, JULIUS CÆSAR (1484-1558). An Italian classical scholar, born at Riva, on Lake Garda, Italy. Up to his forty-second year Giulio Bordoni, as he was originally called, resided chiefly in Venice or Padua, engaged in the study of medicine and natural science. In 1529 he went to Agen to practice medicine and resided there until his death. He left a mass of publications and a great reputation for the extent and depth of his learning. His best known publications are: *Commentarii in Hippocratis Librum de Insomniis; De Causis Linguæ Latinæ Libri XVIII.*, celebrated as the first considerable work written on the Latin language in modern times, and not without value even to-day; his Latin translation of Aristotle's *History of Animals;* his *Exercitationum Exotericarum liber quintus decimus de Subtilitate ad Hieronymum Cardanum;* his seven books of *Poetics* (also in Latin, and on the whole his best work); his *Commentaries on Aristotle and Theophrastus;* his two orations against Erasmus; his Latin poems, etc. Consult: Pattison, *Essays* (Oxford, 1889); Nisard, *Les gladiateurs de la république des lettres* (Paris, 1860); Bourousse de Laffore, *Jules César de l'Escale* (Agen, 1860); Magen, *Documents sur Julius Cæsar Scaliger et sa famille* (ib., 1873).

SCALLOP (OF. *escalope*, from MDutch *schelpe*, Dutch *schelp*, shell; probably connected with Eng. *scalp, scale, shell*). A bivalve mollusk of the family Pectinidæ. The outline is regularly fan-shape, though one valve is often more convex than the other. The hinge is extended by ears, and in most species both valves have ribs radiating from the umbo to the margin. The animal has a small foot. Some of the species are capable of attaching themselves by a byssus; they are capable also of leaping by opening and rapidly closing the valves. Two species occur along the Atlantic coast of the United States, the common scallop (*Pecten irradians*) and the larger and handsomer Northern one (*Pecten Islandicus*), which is sometimes four or five inches across, the valves very much flattened and without radiating ridges; the latter species is found from Vineyard Sound northward, but is most common along the coast of Maine, Nova Scotia, etc. The common scallop is scarcely half the size of the other, the shell is considerably arched, and the radiating ridges are prominent. The scallop is in great demand as a delicacy, the large adductor muscle being the part specially sought after.

Careful and extended studies on the breeding habits of the scallop of Narragansett Bay have been made by Risser. It is a hermaphrodite, and the entire mass of eggs, probably more than a million, may be discharged in the course of an hour and a half. The breeding season is in June. The eggs, which may be artificially fertilized, are spherical and about $\frac{1}{6000}$ of an inch in diameter. The embryo begins to swim within 36 hours after

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fertilization, and the shells are formed when the young is 48 hours old, with the characteristic shape. The scallop spawns when one year old, when the average size is about 2½ inches from the hinge to the ventral margin. It is supposed that the scallop does not live more than two years, and it is evident that taking scallops less than a year old is most injurious to the industry. Scallops which are marked with the 'line of growth' are those which have spawned. Although the ordinary scallop is regarded as a delicacy, the great Northern scallop (*Pecten tenuicostatus*), common in retired harbors on the Labrador coast and in the Gulf of Saint Lawrence, is still more delicious eating.

Fossil scallops are common in the rocks of all formations above the Silurian. For embryology and culture, consult Risser, *31st Report Commissioner of Rhode Island Fisheries* (Providence, 1901). For fossil species, consult Zittel and Eastman, *Textbook of Palæontology*, vol. i. (London, 1900). See Colored Plate of CLAMS AND MUSSELS.

SCALLOP. A device in heraldry. See ESCALOP.

SCALP (probably connected with MDutch *schelpe*, Dutch *schelp*, OHG. *sceliva*, dialectic Ger. *Schelfe*, shell, husk, scale, and ultimately with Eng. *shell*, *scale*). The term employed to designate the outer covering of the skull. Except in the fact that hair in both sexes grows more luxuriantly on the scalp than elsewhere, the skin of the scalp differs slightly from ordinary skin. Besides the skin, the scalp is composed of the expanded tendon of the occipito-frontal muscle, and of intermediate cellular tissue and blood-vessels. Injuries to the scalp are to be treated according to the usual antiseptic methods with especial care to drainage, since any extensive suppurative process beneath the tendon of the occipito-frontalis muscle is likely to cause serious trouble. Extensive injuries with accompanying brain shock of course require absolute rest. Burns of the scalp are very liable to be followed by erysipelas and diffuse inflammation, but the brain is comparatively seldom affected in these cases. Tumor of the scalp is not uncommon, the most frequent being the cutaneous cyst popularly known as *wen* (q.v.), and the vascular tumor.

SCALPING. The custom of removing the scalp of a slain enemy, a practice common to all the Indian tribes east of the Rocky Mountains and in the arid Southwest and the region of the upper Columbia, but apparently unknown, unless as an intrusive custom, among the Eskimo, along the Northwest coast, on the Pacific coast west of the Cascade range and the Sierras, excepting with a few California tribes, or in Mexico and southward. It is said to have existed also among the ancient Scythians. The reason for scalping seems to be that the scalp was the best possible evidence of the warrior's prowess and the most convenient souvenir for ornamentation and exhibition. Men, women, and children alike were scalped, but no scalp was ever knowingly taken from the living enemy. The scalp trophy consisted of the skin, with the hair attached, from the crown of the head over a circular diameter of about four inches. With the warriors of the tribes which practiced this custom the hair on this portion of the head was always permitted to grow its full length and was carefully braided and ornamented with beads or other trinkets, it being held a point of honor not to shave the scalplock. The scalp was removed by drawing the knife in a circle around the scalplock and giving a strong pull, sometimes even using the teeth to help the operation. The scalp was then stretched on a little hoop to dry, after which it was painted on the under side with red paint and mounted at the end of a light rod, to be carried by the women in the subsequent scalp dance. It was afterwards kept by the warrior between the covers of his shield, to be taken out on ceremonial occasions and fastened at his horse's bridle, or was put with the tribal 'medicine,' or perhaps sacrificed to the sun by hanging it upon a tree or pole in some lonely spot. If opportunity permitted, the remainder of the hair with the skin attached was taken at the same time to be divided into scalplocks for use as fringes upon 'war shirts' or leggings.

The custom of scalping was adopted by the whites and extensively practiced, frequently with direct official encouragement, in all the border wars from King Philip's War down to within the last thirty years. The border fighters of a later period invariably scalped their slain Indians when opportunity permitted, and during the Revolutionary struggle both English and American officers encouraged their Indian allies in the practice by offers of bounties and rewards, even, in some cases, where the scalps taken were those of white people. The Mexican Government formerly employed a company of American scalp-hunters against the Apache at the fixed price of one ounce of gold per scalp. Scalps were taken by troops in the Modoc war in 1873.

SCAMAN'DER (Lat., from Gk. Σκάμανδρος, *Skamandros*). The ancient name of a river in the *Troad*, which, according to Homer, was also called Xanthus (Gk., yellow) by the gods. The Scamander rose in Mount Ida (q.v.), and, flowing west and north, discharged itself into the Hellespont, after being joined by the Simois, about two miles from its mouth. Like most other points in Trojan topography, the identity of this river has been disputed. It is now clear that it is the modern Mendereh, though its course has probably changed since ancient times.

SCAMAN'DRIUS (Lat., from Gk. Σκαμάνδριος, *Skamandrios*). The son of Hector and Andromache, called Astyanax (q.v.) by the Trojans.

SCAMMONY (OF. *scammonee*, *scamonee*, *scammonie*, Fr. *scammonée*, from Lat. *scammonea*, *scammonia*, from Gk. σκαμμωνία, *skammonia*, scammony). A gum resin of an ashy gray color, rough externally, and having a resinous, splintering fracture. Few drugs are so uniformly adulterated as scammony, which when pure contains from 81 to 83 per cent. of resin (which is the active purgative ingredient), 6 or 8 of gum, with a little starch, sand, fibre, and water. The ordinary adulterations are chalk, flour, guaiacum, resin, and gum tragacanth. Scammony is an excellent and trustworthy cathartic of the drastic kind. The resin of scammony, which may be extracted from the crude drug by means of alcohol, possesses the advantage of being always of a nearly uniform strength, and of being almost tasteless. The *scammony mixture*, composed of four grains of resin of scammony, triturated with two ounces of milk until a uniform emulsion is obtained, forms an

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admirable purgative. Another popular form for the administration of scammony is the *compound powder of scammony*, composed of scammony, jalap, and ginger. Scammony is frequently given surreptitiously in the form of biscuit to children troubled with threadworms. Scammony is derived from Convolvulus scammonia (natural order Convolvulaceæ), growing in Asia Minor, in Greece, and in the south of Russia. It is a perennial, with a thick, fleshy, tapering root 3 to 4 feet long, and 3 to 4 inches in diameter, which sends up several smooth, slender, twining stems, with leaves shaped like arrowheads, on long stalks. All parts contain a milky juice. The scammony plant is not cultivated, but the drug is collected from it where it grows wild. The ordinary mode of collecting scammony is by laying bare the upper part of the root, making incisions, and placing shells or small vessels to receive the juice as it flows, which soon dries and hardens in the air.

SCAMOZZI, skä-möt'sē, VINCENZO (1552-1616). An Italian architect, born in Vicenza. He studied under Sansovino in Venice. In 1582 he had become master of works of the Procuratie Nuove, and, going to Rome in 1585, came under the influence of Fontana and Bernini. His later works in the Baroque style include the Cornaro Palace on the Grand Canal. To an earlier and less ornate period belong the Barbari monument in the Church of the Carità, which first made him famous, and the library of Saint Mark's, which he completed. He wrote *Idea dell' architettura universale* (1615). Consult the *Life* by Scolari (Treviso, 1837).

SCAMP, or BACALAO. A name in Florida for either of two species of grouper (q.v.), of the genus Mycteroperca, both excellent food-fishes.

SCAN'DERBEG (from Turk. *Iskenderbeg*), Prince ALEXANDER (c.1404-68). A celebrated patriot chief of Albania. His real name was George Castriota, and his father, John Castriota, was one of the hereditary princes of Epirus. In 1413 he was delivered to the Turks as one of the hostages for the allegiance of the Albanian chiefs, and his beauty and intelligence so pleased Amurath II. that he was lodged in the royal palace and brought up in Islamism. Placed at the head of a Turkish force, he fled in 1443 with some three hundred companions to his native country and by a stratagem made himself master of the town of Croia. At the news of his success, the whole country rose in insurrection, and in thirty days he had driven every Turk, except the garrison of Sfetigrad, out of the country. He raised an army of 15,000 men with which he scattered (1444) a Turkish force of 40,000 men. Three other Turkish armies shared the same fate. The Venetians, too, were made to feel the power of the Albanian leader. Amurath II. took the field in 1449 against Scanderbeg and stormed many of the principal fortresses, but was baffled at Croia (1450). Scanderbeg's splendid success brought him congratulations and substantial aid from the Pope and the sovereigns of Naples and Aragon. Mohammed II. granted him favorable terms in 1461, and Scanderbeg thereupon entered Italy, where he maintained the cause of the Aragonese in Naples against the partisans of the House of Anjou (1461-62). At the instigation of the Pope, he broke the truce with the Turks in 1464. Mohammed II. dispatched two great armies for the reduction of Albania, and Croia was unsuccessfully besieged in 1466; but the restless and indomitable chief, worn out with incessant toil, died at Alessio on January 17, 1468. The war continued, but the great mainstay of the country was now wanting, and before the end of 1468 the Turkish power had been firmly established in Epirus. Scanderbeg is said to have vanquished the Turks in twenty-two pitched battles. Consult: Pisko, *Skanderbeg* (Vienna, 1894); Gibbon, *Decline and Fall*, ed. Bury, vol. vii. (London and New York, 1900).

SCAN'DINA'VIA. A name generally used as a collective term for the three kingdoms of Norway, Sweden, and Denmark. In a more restricted and purely geographical sense the name is confined to the great peninsula of Northern Europe, including only Norway and Sweden. The name *Scandia* was first employed by the Romans to designate a large island supposed to lie north of the Baltic Sea. This was probably Southern Sweden, which still bears the name of Skåne, and which was then not known to be connected with the mainland in the north.

SCANDINAVIAN LANGUAGES AND LITERATURE. See DANISH LANGUAGE AND LITERATURE; NORWEGIAN LANGUAGE; NORWEGIAN LITERATURE; SWEDISH LANGUAGE AND LITERATURE.

SCANDINAVIAN MUSIC. Since the beginning of the sixteenth century music has been extensively cultivated in Scandinavia, but until the nineteenth century all forms were modeled after the music of Italy, Germany, and France.

DENMARK. The earliest operas written upon Danish texts were by German composers who lived in Denmark. The more prominent among these are J. A. Schulz, Kunzen, Weyse, and Kuhlau. The first native Danish composer of note is Berggreen (1801-80), whose opera *Billedet og Busten* appeared in 1832. In the works of Johan Peder Emilius Hartmann (1805-1900) specifically northern traits appear, so that he is to be regarded as the founder of a national Danish school. This new school obtained general recognition through the works of Gade (1817-90), in whose overtures and symphonies distinctive Scandinavian themes are developed. Hartmann's son, Emil Hartmann (1836-98), added several operas to the Danish repertoire. Although in his instrumental works he strictly adheres to classical forms, he gives them a national coloring by consciously emphasizing the Scandinavian element. Winding (1835-99) was an instrumental composer of merit, in whose works the national element appears rather as the expression of his natural talent than as a conscious attempt to obtain local color. Hannerik (1843—) at first attracted some attention with his *Northern Suites*, but gradually subordinated Scandinavian characteristics to an excessive technical development of the orchestra. The younger Danish composers include Ludwig Schylte (1848—), whose works are also warmly appreciated outside of Denmark, and Enna (1860—), whose opera *The Witch* created a sensation in 1892 in Copenhagen. In the field of dance music Denmark has produced Lumbye (1810-74), who wrote about 300 dances that are remarkable for their original and piquant

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rhythms and melodic invention. Special mention must be made of the great seventeenth-century master, Danish by birth, though he lived chiefly in Germany, Dietrich Buxtehude (1637-1707). He is one of those who created a distinctly instrumental style for the organ and materially advanced not only the style of organ-playing, but also the instrumental forms of the toccata and fugue.

SWEDEN. During the sixteenth century Gustavus Vasa attached many noted foreign artists to his Court, and thus in Sweden also the cultivation of music at first remained in the hands of foreigners. The first composer of note was a German, Häffner (1759-1833), who settled in Stockholm in 1780. In his operas he is a mere imitator of Gluck, but in his Swedish songs he struck a distinct national tone. He also did much for the cause of Swedish music by his arrangements and publication of old Swedish national folk-song, and the restoration of the melodies in the "Svensk choralbok." The first native-born composer of significance was Franz Berwald (1796-1868), who wrote some good chamber-music and six operas, and attracted the attention of Liszt and Bülow. Of more importance is Lindblad (1801-78), the teacher of Jenny Lind. He wrote little besides songs, which, however, are remarkable, especially in their skillful use of local color. Hällström (1826—) is highly esteemed by his compatriots for his operas, which are characteristically Swedish. Södermann (1832-76) was a musician of rare talent, a master of orchestral writing, and became well known outside of Sweden for his large works for chorus and orchestra. His harmony is refined and individual, his melodic invention original. A composer much esteemed for his symphonies, overtures, and chamber-music is Norman (1831-85). The operas of Hallén (1846—) are strongly influenced by Wagner, yet they also preserve Swedish characteristics. Sjögren (1853—) has written songs and beautiful compositions for the piano. He enjoys the reputation of being Sweden's greatest melodist. Stenhammar (1870—) attracted considerable attention through four concerts for the piano. His other works include choral ballads, overtures, and three string quartets.

NORWAY. The way for national Norwegian composers was prepared by Lindemann (1812-87), who collected and published more than 500 folk-songs. The first native composer is Kjerulf (1815-68). The number of his works is small, but both his songs and his instrumental music show national characteristics. Svendson (1840—) has an international reputation. His works are thoroughly individual and often betray the composer's nationality by a certain harshness, although in his orchestral works he follows the neo-German school of programme music, as becomes evident from the titles of some compositions: prelude to Björnson's *Siguard Slembe*, overture to *Romeo and Juliet*, legend for orchestra *Zarahayde*, *Northern Carnevæl*. In his two symphonies op. 4 and 15 he uses the form established by the classic masters, but does not hesitate to introduce national melodies. Norwegian music suffered a serious loss through the premature death of the talented Nordraak (1842-66). At a very early age he was attracted by the peculiarities of Norwegian folk-music. Shortly before his death he became acquainted with Grieg (q.v.), who at that time was under the influence of Hartmann and Gade, and Nordraak soon aroused in his new friend the same enthusiasm which he himself felt for Norwegian melodies.

The works of Sinding (1856—) have attracted universal attention. He does not confine himself to the exclusive cultivation of national traits, but employs the larger forms (symphony, chamber-music, concertos). If he is somewhat lacking in the refinement and delicacy of Grieg, he exhibits greater power in delineating passion. Consult: Von Ravn, "Skandinavische Musik," in supplement to Mendel's *Lexikon* (Leipzig, 1882); H. Riemann, *Geschichte der Musik seit Beethoven* (Leipzig, 1901); Soubise, *Histoire de la musique* ("Etats Scandinaves") (Paris, 1901).

SCANDINAVIAN and **TEUTONIC MYTHOLOGY.** The religion of the Germanic peoples. Teutonic mythology is so largely based upon Scandinavian sources as to render the two terms almost synonymous. The number of nature gods, with marked, strong individuality, is small; the proportion of spirits and demons, elves, dwarfs, and giants, valkyries, swan-maidens, and norns, unusually large. Most of these creations are mere folk-lore or poetic personifications, rather than real mythic figures, founded upon a definite fact in outside nature, or some permanent element in the inner consciousness of man.

The final conversion of the Northern Teutons to Christianity took place about A.D. 1000. The native sources of mythology are in general not earlier than that date, many of them much later. The *Elder* or *Poetic Edda* (see EDDA) dates from the tenth century; the *Younger* or *Prose Edda* and the Sagas are about two centuries later. Both these dates make it likely, first, that the native ideas on the subject are present in an advanced and tangled form, considerably removed from the mythic roots that started them; secondly, that there is a strong admixture of Christian, and perhaps even classical ideas. There are indeed foreign influences in Scandinavian mythology, but, despite this non-Teutonic element, the mythology is essentially national in spirit and character.

The Scandinavian gods are anthropomorphic, like the Greek gods, but not as plastic as they. Their personality is rugged, even if they fall short both in the graceful fancy and the finished mastery of the Greek deities. In the main, however, the gods portray men: Odin (q.v.) is a powerful, shrewd, not unkindly old man; Loki is ill-tempered, fickle, deceitful, and calumniating; Balder is wondrously fair, beloved of all; Thor performs incredible deeds, but only when he has his hammer Mjollnir; Frigg or Frigga is Odin's housewife, the mother of Balder (q.v.). The gods are human in their needs and infirmities; they eat and drink—solemnly and copiously, as Teuton gods should. Odin has lost an eye, having pledged it for a draught from the fountain of Mimir, the source of all wisdom; Tyr has lost a hand; Balder perishes. Their character, their emotions, and such morality as they claim are entirely human. They are kind or ferocious, shrewd or foolish. Frigg, Odin's wife, is the highest representation of heavenly virtue; she is the severe, rather shrewish guardian of domestic virtue and sexual morality.

The absence of truly lofty traits, æsthetical or

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ethical, from the character of the gods is reflected in their worshipers. There is no piety, nor is there much faith beyond the assurance that the gods are likely to take a hand in the affairs of men. Neither gods nor men are always acting rightfully, nor are accursed deeds always avenged. Hence the gloomy idea of the so-called *norns* (q.v.). Over and above the natural sequence of either divine or human events, and above right and wrong, there is a higher inexorable law which dominates over gods and men alike. Hence, too, the power of gods and men is often dependent, not upon their inner quality, but rather upon external conditions, or upon the possession of sundry magical objects. Odin's throne Hlidhskjalf enables him, or any one else who may happen to sit on it, to see all the world, and Thor's strength depends upon his hammer. The gods called Æsir (q.v.) fasten the hell wolf Fenrir (see FENRIR; RAGNARÖK) with the fetter Gleipnir, made out of the sound caused by the footfall of cats, of the beards of women, the roots of mountains, the breath of fish, and the spittle of birds.

The Edda furnishes an account of creation, and of the Scandinavian Olympus, which presents a fair average of Teutonic ideas on these subjects. The first and eldest of the gods is Odin, the All-Father, who lives from all ages, rules over all his realm, heaven and earth, and man. All the righteous shall live and be with himself in Walhalla (q.v.); but the wicked fare to Hel and thence into Niflheim (q.v.) or Niflhel, beneath in the ninth world. At first neither heaven nor earth existed, only a yawning abyss. Then the giants made a citadel for the gods called Asgard (q.v.), to which the gods ascended by the rainbow bridge called Bifröst (q.v.). There Odin sits in his high seat. His wife is Frigg, and their offspring are the Æsir (q.v.). Odin's first son is Thor (q.v.), the strongest of the gods. He has a hammer, called Mjollnir, a strength-belt, and iron gloves that he may hold his hammer's haft. Balder is Odin's second son, fair and beautiful, and praised by all. Tyr (q.v.) is daring and stanch, while Bragi (q.v.) is famous for wisdom, clever in speech and song-craft. Among others who are good and great are Heimdallr (see RAGNARÖK), Hoenir, Vidharr, and Vali. Loki (q.v.), fair of face, ill in temper, and fickle of mood, is called the backbiter of the Æsir, the speaker of evil speech and shame of all gods and men, whom he constantly deceives. The highest seat of the gods is at the ash-tree Yggdrasil (q.v.). One of the three roots of this 'world-tree' goes to heaven to the Æsir. A second reaches to the winter giants. Under that root is the spring of Mimir (q.v.), Odin's uncle. There, once upon a time, came Odin, and begged a drink. His wisdom was exhausted, and the end of things seemed near. Mimir asked for the eye of Odin as a pledge, which the god sacrificed. The third root reaches to lowest hell. A fair hall stands under the ash by the spring, and out of it come the three norns 'Has-been' (*Urdhr*), 'Being' (*Verdhandi*), and 'Will-be' (*Skuld*), and grave on a shield the destiny of men.

The heroes that have fallen in battle, from the beginning of the world, go to Odin in Walhalla. Odin's 'battle-maidens,' the walkyries, protect his favorites, and grant them victory. But, when their day has come, the walkyries, who have hitherto been invisible, reveal themselves, and conduct the fallen heroes to Walhalla. There they eat of the flesh of the boar Soehrimnir every day and drink the mead from the goat Heidhrun. Every day the heroes put on their armor and fight with each other for their sport. At evening they ride home to Walhalla and sit down to drink. But an uncertain future throws its shadow even over the citadel of the gods, for no one knows when the enemies of the Æsir will break their bonds and cause the downfall of the world. See RAGNARÖK.

Only a small stock of the Teutonic divinities can be traced with certainty to the Indo-Germanic period. In Scandinavian *tivar*, a collective designation of the gods, and in the name *Tyr*, Old High German *Zio*, we have the shining sky-god of the prehistoric myth, reflected by Sanskrit *devas*, Lithuanian *dëvas*, Old Irish *dia*, 'god,' Lat. *dīvus*, 'divine.' The direct equation of *Tyr*, *Zio*, with Vedic *Dyāuṣ pitar*, Greek *Ζεὺς πατήρ*, Lat. *Jupiter* (q.v.), has been questioned, but there is no doubt that *Tyr*, *Zio*, is the prehistoric sky and day god. The Scandinavian *Æsir*, German *Asen*, another generic designation of the gods, points with great certainty, through Sanskrit *asu*, 'life, spirit,' Avestan *aṁhu*, 'lord,' to the *Asura-Ahurā*, the highest generic name for Indo-Iranian divinities. *Odin* or *Wotan* may not be severed from the Vedic storm god *Vāta*, 'Wind.' Slight phonetic obscurities notwithstanding, the Scandinavian god and goddess *Fjorgynn* and *Fjorgyn* are identical with the Lithuanian *Perkunas*, Vedic *Parjanya* (q.v.), 'god of thunder.' Less certain, though probable, is the connection of the words for *elf* (Anglo-Saxon *ælfr*, Scandinavian *alfr*) with the *ṛbhu* (see RIBHUS) of the Veda. Both types of divinities are famed for skill rather than strength; they are probably divinities of light, connected with the fashioning of the seasons and the year.

In the common Teutonic period three mighty gods and one goddess were worshiped, Tyr, Odin, Thor, and Frigg. Four days of the week, Tuesday, Wednesday, Thursday, and Friday, were consecrated to them. Tyr, the ancient sky god, became a war god and lost his early importance. Wodanaz (Scandinavian Odin) was originally a storm god. In the belief of the Germans he figures as the leader of the 'Furious Host,' or 'Wild Hunt.' The souls of the dead are thought to sweep with him through the air, so he becomes the leader of the souls and god of the dead. He develops also into a god of war, and finally in the Scandinavian North into the head of Walhalla, creator, orderer of the world, and god of wisdom. Each day he lets fly his two ravens, Huginn and Munin (thought and memory); when they return they alight upon his shoulders, and tell him of all that comes to pass and all that is to be.

The most popular god of Scandinavia is Thor. His mother is Fjorgyn, a female personification of thunder, and he is himself thunder personified. He is surnamed Hlorridhi, 'roarer;' his hair and beard are red, typifying the lightning, and he wields the hammer Mjollnir, which returns of itself to the hand of the god after crushing his enemies. In many myths he is the chief defender of the heavenly citadel Asgard against the attacks of the giants. He is a popular god in distinction from the more aristocratic Odin, being simple and rough, passionate, and de-

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voted to eating and drinking. Thor's picture is carved on the seat of honor of the master of the house, to bring comfort and prosperity to the household.

The last of the Teuton divinities, to whom was consecrated a day of the week, is Frigg, the wife of Odin. With him she surveys, from his seat Hlidhskjalf, the whole universe, and knows, as Odin's confidante, the fates of men. She is in charge of marriage, of housewifely success and happiness, and of marital fidelity. Sterile women pray to her for children, and she gives aid in the throes of childbirth. Veiled, with a distaff in her hand, and a bunch of keys at her side, she typifies the true Teuton housewife. She is the devoted mother of Balder, and weeps when he is slain. The Scandinavian myth has created a goddess Freyja (q.v.), in addition to Frigg, as a female abstraction, or sister, of the male god Freyr. The latter is one of the Vanir, a class of gods who appear to be in some kind of opposition to the Æsir. As Freyr is a god of love and fruitfulness, his female counterpart Freyja is the fairest of goddesses, beneficent, and invoked in affairs of love, and is invoked in company with Frigg.

The two most important remaining characters of Scandinavian mythology are Balder and Loki. Balder, the son of Odin, and husband of Nanna, is the darling of the gods. He is so fair that light streams from him, and the whitest of all flowers is likened to him. He has an evil dream of impending danger, and therefore Frigg, his mother, puts all animate and inanimate things under a vow not to harm Balder. On the field the gods, certain not to hurt him, begin to throw all sorts of objects at him. Nothing harms him. Loki changes into a woman and extracts from Frigg the information that she had put all things under a vow, except the mistletoe, which was too young to be able to do him harm. Loki then puts the mistletoe into the hands of Hodhr, Balder's brother, to shoot as an arrow. The missile hits the mark and Balder falls dead. The kernel of the myth is probably the vanishing of the summer sun in winter. Balder, god of physical light, has become the emblem of purity and innocence. Balder's death ushers in the destruction of the world in Ragnarök (q.v.)

Loki is deceitful and malicious in character, and his naturalistic basis is problematical. He appears only in the Scandinavian myth. Though he often goes in the company of the gods, himself one of the Æsir, yet on the whole, whatever his origin, Mephistophelian deviltry is a constant element of his character. Both his origin and name have been traced to Lucifer. His part in Balder's death has been shown above. Loki once ate the heart of a courtesan, became pregnant thereof, and gave birth to monsters, the wolf Fenrir, the serpent Midhgardh, and Hel (q.v.), the goddess of death. As a boatswain upon a ship he leads the dark powers against the Æsir at Ragnarök. No Teutonic god has been explained more variously, as Fire, as the equivalent of the Vedic demon Vritra, as Prometheus, Vulcan, Lucifer, and other types. His name is supposed to mean 'the closer'—a vague and doubtful appellation. It seems likely that he contains at least in part a demonic personification of Fire. and as such Richard Wagner pictured him in his Nibelungen tetralogy.

Consult: Müller, *Geschichte und System der altdeutschen Religion* (Göttingen, 1844); Holtzmann, *Deutsche Mythologie* (Leipzig, 1874); Wolf, *Beiträge zur deutschen Mythologie* (Göttingen, 1852-54); Mannhardt, *Germanische Mythen* (Berlin, 1858); id., *Die Götterwelt der deutschen und nordischen Völker* (ib., 1860); Grimm, *Deutsche Mythologie* (4th ed., ib., 1875-78); Simrock, *Handbuch der deutschen Mythologie* (6th ed., Bonn, 1878); Andersen, *Mythologie scandinave* (Paris, 1886); Hahn, *Odin und sein Reich* (Berlin, 1887); Meyer, *Germanische Mythologie* (ib., 1891); Gummere, *Germanic Origins* (New York, 1892); Kauffmann, *Deutsche Mythologie* (2d ed., Stuttgart, 1893); Golther, *Handbuch der germanischen Mythologie* (Leipzig, 1895); Hermann, *Deutsche Mythologie* (ib., 1898); Mogk, "Germanische Mythologie," in Paul, *Grundriss der germanischen Philologie*, vol. ii. (2d ed., Strassburg, 1898); La Saussaye, *Religion of the Teutons* (translated by Vos, Boston, 1902).

SCANDINAVIANS. People of the Scandinavian group of the Teutonic stock consisting of the Norwegians, Swedes, Danes, and Icelanders. They are long-headed blonds. Prehistoric remains show that Scandinavia was settled in the Neolithic Stone Age, probably by migrants from the Eurasian steppes who followed a more northern route than the Slavs and developed the physical characters which are noticeable in the Teutonic stock. Scandinavia is believed by many to be the true home of the Teutonic race. These original migrants were the Gotar and Svear, who are now collectively grouped as the Scandinavians.

The settlement of Scandinavia began after the retreat of the ice cap of the Glacial period; hence the earliest and by far the most abundant traces of Neolithic man are found in the southern portion. Nowhere is the sequence of culture periods more orderly than in this region, and from this fact the students of Scandinavia have been foremost in giving to the science of archæology a sequential basis. The burial places of the Polished Stone Age in Southern Sweden and Norway consist of dolmens, stone graves, and mounds; funeral chambers with galleries and kitchen-middens (q.v.) are also found. The Bronze Age brought in a higher civilization, and through this age and the succeeding age of iron to the historic period may be traced an increasing culture. With the Iron Age came the alphabet and the writing of runes, the use of which survived in Gothland till the sixteenth century. The Scandinavians appear in history at the time of the sea-roving expeditions, when they came in actual contact with many civilized nations and carried back to the north coins and art works of these nations. The trade in amber, which followed a well-known route, also had its effect upon the culture of Scandinavia. The inexhaustible supply of food, especially of fish, gave rise to early commerce between the peoples of this region and the nations to the south, explaining largely the diffusion of foreign culture in Scandinavia. The Swedes have taken less of blending than the Norwegians or Danes, and preserve the best type of the early migrants, especially in the Dalecarlians. The only foreign types of the region are the Laps and the settlements of shortheads on the west coast of Norway.

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SCAPA. The popular designation of the Society for Checking the Abuses of Public Advertising, in London, founded for the purpose of restraining, through legislation and social influence, the disfigurement of towns and rural districts by glaringly hideous business announcements. It has been fairly successful in London, where it has been instrumental in abolishing certain abuses, mostly the obnoxious "sky-signs." It publishes a journal, *A Beautiful World.*

SCAPHOID BONE (from Gk. σκαφοειδής, *skaphoeidēs*, boat-shaped, bowl-shaped, from σκάφη, *skaphē*, σκάφος, *skaphos*, boat, bowl + εἶδος, *eidos*, shape). A term applied to a somewhat boat-shaped bone in the carpus or wrist (see HAND), and in the tarsus of the foot (q.v.).

SCAPHOP'ODA (Neo-Lat. nom. pl. from Gk. σκάφη, *skaphē*, σκάφος, *skaphos*, boat, bowl + πούς, *pous*, foot). A class of mollusks represented by the tooth-shells (Dentalium). The scaphopods are intermediate between the gastropods and pelecypods. The shell is white, very long and slender, slightly curved, and open at both ends. The scaphopods are found in shallow water near shore, chiefly in the warmer parts of the world. Fossil scaphopod shells are known from Paleozoic rocks, but they were not common until the Cretaceous.

SCAPIN, skȧ'păn'. The valet of Léandre in Molière's comedy *Les fourberies de Scapin;* a master in deceit, who manages the love affairs of his master and friend by false pretenses, and finally gains forgiveness by feigning a dying state. The name became current in France for a trickster, and the Abbé de Pradt called Napoleon 'Jupiter Scapin.'

SCAPULA (Lat., shoulder), or SHOULDER-BLADE. A flat triangular bone, which, when the arm hangs loosely down, extends posteriorly and laterally from the first to about the seventh rib. It presents for examination an outer convex and an inner, smooth, concave surface, three borders (a superior, an inferior or axillary, and a posterior), three angles, and certain outstanding processes.

Its outer, or posterior, surface is divided into two unequal parts, the supraspinous fossa, and the infraspinous fossa, by the spine, a crest of bone commencing at a smooth triangular surface on the posterior border, and running across toward the upper part of the neck of the scapula, after which it alters its direction, and projects forward so as to form a lofty arch, known as the acromion process, which overhangs the glenoid cavity, or receptacle for the head of the humerus or main bone of the arm. This acromion serves to protect the shoulder-joint, as well as to give great leverage to the deltoid muscle which raises the arm. It is this process which gives to the shoulder its natural roundness. From the upper part of the neck there proceeds a remarkable curved projection, called the coracoid process, from its supposed resemblance to the beak of a raven. It is about two inches long, and gives attachments to several muscles. The upper border of the scapula presents a notch, which in the recent state is bridged over with a ligament, and gives passage to the suprascapular nerve. This bone articulates with the clavicle and humerus, and gives attachment to no less than sixteen muscles, many of which, as the biceps, triceps, deltoid, and serratus magnus, are very powerful and important.

SCAPULAR (ML. *scapularium, scapulare,* from *scapularis,* pertaining to the shoulders, from Lat. *scapula,* shoulder). A portion of the monastic habit in certain religious Orders. It consists of a long strip of serge or stuff which passes over the head, one flap hanging down in front, the other behind. With the growth of pious confraternities of people living in the world but affiliated with the religious Orders, the practice grew up and is usual to-day among devout Roman Catholics of wearing a small scapular, which is simply two little pieces of cloth joined by strings. These scapulars are of different colors according to the confraternities of which they are the badges. The oldest and most widespread of such associations is that of Our Lady of Mount Carmel, founded by Saint Simon Stock, sixth general of the Carmelites (q.v.), in 1251, as a consequence of a revelation which he believed himself to have received from the Blessed Virgin Mary in a vision. The granting of the scapular is generally a privilege of religious Orders, and the wearing of them is encouraged by many indulgences. By benediction they acquire the character of sacramentals (q.v.).

SCAR'ABÆ'IDÆ (Neo-Lat. nom. pl., from Lat. *scarabæus,* beetle; connected with Gk. κάραβος, *karabos,* Skt. *śarabha, śalabha,* locust + Gk. εἶδος, *eidos,* form), or CHAFERS. A family of beetles of the lamellicorn group, many of remarkable size and strange structure. About 13,000 species are already known, and about 300 new species are described each year. The leaflets of the antennæ are well adapted to each other and may be separated; the number of visible ventral segments of the abdomen is six. The family is divided into five subfamilies: Coprinæ, Melolonthinæ, Rutelinæ, Dynastinæ, and Cetoniinæ. The Coprinæ (about 5000 species) have already been treated under DUNG-BEETLE. The Melolonthinæ (4000 species) resemble the common May beetle, and their larvæ, for the most part, live beneath the surface of the ground and feed upon the roots of various plants, frequently doing great damage to pasture land. The rose-chafer (see ROSE INSECTS) is a prominent representative of this group. Many of the adult beetles feed upon leaves of trees and smaller plants, but some, usually found upon flowers, feed upon pollen, and are of some service in the cross-fertilization of plants. The Rutelinæ (about 1500 species) are insects of brilliant metallic colors, and are more abundant in tropical than in temperate regions. Their larvæ resemble those of the Melolonthinæ. Well-known examples of this group in the United States are the goldsmith beetle (*Cotalpa lanigera*), the spotted vine-chafer (*Pelidnota punctata*), and the wonderfully beautiful *Plusiotis gloriosa,* from Arizona, which is pale green in color, and has the margins of all parts of the body and broad stripes on the elytra of a pure polished gold color. It is one of the most beautiful beetles in the world, and is figured on the Colored Plate of BEETLES. The Dynastinæ, which comprise many very conspicuous insects, include only about 1000 species, among which are some of the largest insects in existence, especially in the genera Dynastes and Megasoma. The males of these genera and others bear large horns upon the head and prothorax,

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the use of which in the economy of the species cannot be conjectured. Their larvæ are usually strongly curved, and feed upon decaying vegetable matter. The Cetoniinæ (about 1600 species) occur mostly in the tropical regions of the Old World. During flight the elytra of these beetles remain closed, the wings extending out from beneath the base of the wing-covers. Some of the species eat honey, others overripe or decaying fruits, and others lick the sap from wounded trees. To this group belong the sap-chafer, the goliath beetle, and the June beetle (qq.v.) of the Southern United States. Both adults and larvæ of some species live in ants' nests. See BEETLE; CHAFER; ROSE-CHAFER; see also Figs. 7 and 9 of Plate BEETLES; also the figure of larva of a beetle in the same article, which is a good example of the scarabæid type of larva.

SCAR'ABÆ'US (Lat., beetle). A black or metallic colored dung-beetle, the *Ateuchus Sacer* or *Scarabæus Ægyptiorum*, common in Mediterranean countries, and especially in Egypt. The Egyptian name of the insect was *kheper*, from a stem meaning 'to become, to come into being,' and a picture of the beetle was the usual ideographic sign for the verbal stem and its derivatives. The Egyptians believed that no female of the species existed, but that the male, contravening the ordinary law of generation, himself produced the egg and thus perpetuated his existence by his own act. The scarabæus, therefore, became the type and emblem of all 'self-begotten' deities, and in particular of the god Kheperi, whose name signifies 'he who is (in process of) becoming.' This deity typified the rising sun, renewing its birth each morning, and he is usually represented as a man with a scarabæus upon, or in place of, his head. The scarabæus was also the type of the human soul emerging from the mummy, just as the beetle emerged from its egg, and flying upward to heaven, and thus the insect became a symbol of the resurrection and of immortality. From a very early period scarabæi, carved out of metal or of stone, or molded in faïence, were used as amulets. They were inscribed with religious texts, with the names of deities or famous kings, or with symbolic magical devices, and were worn by the living or placed upon the mummies of the dead. Such carved scarabæi are usually called scarabs, and large numbers of them have been found dating from nearly all periods of Egyptian history. In the earlier specimens the wings are folded; in later times the beetle is not infrequently represented with the wings extended. In the mummy, a large scarab, inscribed with a particular chapter of the *Book of the Dead* (q.v.), usually replaced the heart of the deceased, which was removed during the process of embalmment. By virtue of this amulet the deceased was enabled to pass the ordeal of the 'weighing of the heart' at the final judgment. (See DEAD, JUDGMENT OF THE.) Consult: Wiedemann, *Religion of the Ancient Egyptians* (New York, 1897); Petrie, *Historical Scarabs* (London, 1899); Myer, *Scarabs* (ib., 1894); Ward, *Sacred Beetle* (New York, 1902).

SCARAMOUCH (Fr. *scaramouche*, from It. *scaramuccia*, skirmish). A character in the old Italian comedy, originally derived from Spain, representing a military poltroon and braggadocio. He was dressed in a sort of Hispano-Neapolitan costume, entirely black, with a mask open on the forehead, cheeks, and chin, and regularly received an inglorious drubbing at the hands of Harlequin or Polichinelle. The most celebrated actor of the character was the Neapolitan comedian Tiberio Fiorilli (1608-96), who lived in France after 1640 and was better known as *Scaramouche* than by his own name.

SCARBOROUGH, skär'brô *or* skär'bŭr-ô. A seaport and health resort, popularly called the 'Queen of English Watering Places,' in Yorkshire, England, in the North Riding, 37 miles northeast of York (Map: England, F 2). The town is built in successive terraces and crescents on rising ground around a beautiful bay open to the south and southwest, and protected on the northeast by a promontory ending in a castle-crowned height, which looks out on the North Sea. Two bridges span the picturesque ravine of Ramsdale Valley and connect the western or ancient part of the town with its large and fashionable southern suburb. There is a fine promenade pier, and the tidal harbor, inclosed by three piers, has a lighthouse and floating dock. The chief buildings are the spa, an extensive aquarium, museum, and market hall. The municipality owns considerable real estate and the water and gas supplies, and has built a marine drive and sea wall around the castle, two and one-fourth miles in length. There are manufactures of jet; a coasting trade; and lucrative fisheries. The castle was erected about the year 1136. Here Piers Gaveston (q.v.) was besieged by the barons in 1312. It was twice besieged by the Parliamentary forces. It serves as a barrack, and is fortified by batteries. Population, in 1891, 33,800; in 1901, 38,200. Consult Haviland, *Scarborough as a Health Resort* (London, 1884).

SCARF-SKIN. See SKIN.

SCARIA, skä'rē-ä, EMIL (1838-86). An Austrian dramatic bass singer, born at Gratz. He made a successful début in 1860, at Pesth, as Saint-Bris in *Les Huguenots*. In 1862 he went to London to finish his studies under Garcia. Afterwards he was engaged at Dessau, Leipzig, Dresden, and finally at the Court Opera in Vienna. He was a most remarkable bass and was celebrated as an interpreter of Wagner, creating the rôle of Wotan at Bayreuth in 1876, and Gurnemanz (*Parsifal*) in 1882.

SCARIDÆ (Neo-Lat. nom. pl., from Lat. *scarus*, from Gk. σκάρος, *skaros*, sort of sea-fish). A large family of tropical bony fishes comprising the parrot-fishes (q.v.). The body is oblong with large scales, and often gorgeously colored.

SCARLATTI, skär-lät'tē, ALESSANDRO (1649-1725). An Italian composer, born at Trapani in Sicily. In 1680 Scarlatti visited Rome, and composed his first opera, *L'onestà nell' amore*, first performed at the Court of Queen Christina of Sweden. His opera *Pompeo* was performed at Naples in 1684. In 1693 he composed the oratorio *I dolori di Maria sempre Vergine*, and the opera *Teodore*, in which (so far as known) orchestral accompaniments were first introduced to the recitatives, and a separate design was given to the accompaniments of the arias. In the following eight years, during part of which time he was *maestro di cappella* at Naples, he produced various operas, the most remarkable being *Laodicea e Berenice*, composed in 1701. Between

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1703 and 1709 he was *maestro di capella* at Santa Maria Maggiore at Rome; he then returned to Naples, and in 1715 produced *Il Tigrane*. His musical works comprise 117 operas, several oratorios, and a great deal of church music, besides various madrigals and other chamber music. He was the founder of the Neapolitan school, in which were trained most of the great musicians of the eighteenth century. His modulations, often unexpected, are never harsh, and never difficult for the voice. He is supposed to have been the first composer or musician to divide the strings into four parts. His instrumentation is both bold and skillful; and his orchestration shows that he had a knowledge and appreciation of the art of grouping instruments of differing timbre which was remarkable for his time.

SCARLET (OF. *escarlate*, Fr. *écarlate*, from ML. *scarlatum*, scarlet, scarlet cloth, from Pers. *saqalāt*, *siqalāt*, *suqlāt*, scarlet cloth). A vivid red color, inclining toward orange. It was formerly obtained exclusively from the cochineal (q.v.) insect, treated with zinc chloride and cream of tartar, but it is also now derived from coal-tar (q.v.). It is frequently used in the fine arts and in dyeing, and, like purple, was esteemed a color particularly suitable for costly attire.

SCARLET FEVER, or SCARLATINA. One of the exanthemata or eruptive fevers. It is a contagious disease and is characterized by fever, sore throat, a bright red eruption, and a tendency to acute inflammation of the kidneys. Children are chiefly affected, and one attack protects against another. This explains its rarity in adult life. Scarlatina is extremely infectious and contagious, and the *contagium* has been carried by books, papers, and clothing for long distances. Three varieties of the malady are usually described, viz.: The ordinary form, *scarlatina simplex*, in which the rash and fever are present, with but few throat symptoms; *scarlatina anginosa*, in which, in addition to the rash and fever, the throat is severely affected; and *scarlatina maligna*, in which the attack is violent and the system is rapidly overwhelmed with the infection. This form is usually fatal in two or three days.

Scarlet fever begins as a rule suddenly, after an incubation period of from 4 to 6 days, with a chill, vomiting, headache, languor, pains in the back and limbs, and loss of appetite. The temperature rises rapidly to 103° or 105° F., and remains high during the course of the disease. The rash appears from 12 to 36 hours after the first symptoms, first on the chest and neck, but spreading over the entire body in a few hours. It consists of minute red spots set closely together, so that the skin is covered with a bright red flush. About the fifth day the rash begins to fade and is followed by desquamation or shedding of the superficial layers of the skin. This occurs in the form of white branny scales; in some cases the epidermis peels off in large flakes or, more rarely, complete molds of the hands, fingers, or toes are cast off. During the desquamative stage the disease is believed to be most contagious. The throat and tonsils are dark red and swollen, the latter sometimes covered with a yellowish secretion. The tongue is at first thickly covered with white fur, but this soon disappears, leaving a bright red, raw surface, studded with prominent papillæ, giving rise to the appearance known as 'strawberry tongue.' About the fifth day of the fever the disease begins to abate; the temperature falls, the rash fades, and convalescence is gradually established. In severe cases, however, the mental faculties are dulled, delirium is frequent, particularly toward night, and drowsiness, deepening to coma, supervenes. Death may occur at this point from exhaustion, or it may occur later from various complications. The principal of these are nephritis and otitis media (q.v.). The latter is set up by extension of the inflammation from the throat, and a resulting abscess of the middle ear, with rupture of the drum membrane and chronic otorrhœa, is set up. Both ears may be affected simultaneously, and in a young child permanent deafness or deafmutism may result. In violent inflammations of the middle ear the mastoid cells may be involved, and meningitis, abscess of the brain, or pyæmia from thrombosis of the lateral sinus leads to a fatal termination. Nephritis is usually first recognized during convalescence, while desquamation is going on. Some swelling of the face and feet may be noticed, and the urine is found to be scanty, high-colored, and albuminous. Dropsy may become general and death supervene. The mortality in scarlatina may be low in mild epidemics, but in others rises to 30 or 40 per cent.

Scarlet fever presents very little characteristic pathology. While, from its course, symptoms, and pathology, unquestionably an infectious disease, it has as yet baffled all attempts to determine its specific micro-organism. The most characteristic lesion is that of the skin. This is a simple dermatitis. As a result of this dermatitis there is an infiltration of the papillæ and layer just beneath with leucocytes. In some cases hemorrhages occur into the skin. This acute inflammation stimulates the proliferation of epithelium, and the more than normally rapid casting off of the surface cells constitutes the 'peeling' or desquamation so characteristic of the later stages of the disease. This appearance of the skin, while quite characteristic during life, is often very indistinct after death. Inflammations of the mucous membranes of the pharynx, larynx, tonsils, and bronchi are of almost constant occurrence. This inflammation may be simply catarrhal in character or, more rarely, is diphtheritic. Still more rarely it is of a gangrenous nature. Acute inflammation of the lymph nodes sometimes occurs. This may be of the nature of a simple hyperplasia with or without exudation, or the glands may go on to suppuration. The spleen is usually enlarged. Acute inflammation of the kidney is common, while inflammations of the pericardium and endocardium and of the lungs are not infrequent complications or sequellæ. Whatever the specific organism of scarlet fever, it certainly has the effect upon the body tissues of rendering them much more susceptible than they normally are to infection by other pathogenic micro-organisms. The most common is a streptococcus infection causing croupous inflammations of the mouth and upper respiratory tract. It is probable that the inflammations of lymph nodes, the suppurative conditions which frequently occur, the pneumonia, pericarditis, endocarditis, etc., are usually the result of a secondary infection by pyogenic micro-organisms. The Klebs-Loeffler bacillus or bacillus of true diphtheria is sometimes present in scarlet fever.

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The treatment is that of fevers in general. Isolation is essential. Absolute rest, liquid diet, and a well-ventilated room should be provided. The temperature is kept down by means of appropriate drugs, cooling drinks, cold sponging, or bathing; the action of the kidneys and skin is promoted by these measures and by the administration of diuretic medicines. The strength is supported by frequent liquid feedings and by giving suitable amounts of whisky or brandy. Antiseptic sprays and douches help to prevent the throat infection through the Eustachian tubes to the ears, and render the patient more comfortable. During the period of desquamation the body should be washed night and morning with soap and warm water, and in the intervals smeared or rubbed with carbolized oil or ointment to prevent particles of epithelium from being carried off into the atmosphere bearing contagion with them. At least six weeks should elapse before the patient is allowed to mingle with his fellows. Treatment of the principal complications of scarlatina is considered under NEPHRITIS and OTITIS MEDIA.

SCARLET LETTER, THE. A novel by Nathaniel Hawthorne (q.v.).

SCARLET SNAKE. A brilliant red snake (*Osceola elapsoidea*) marked with jet-black, white-bordered rings, dwelling in the Southern United States; it is allied to the milk-snake.

SCAR'LETT, Sir JAMES YORKE (1799-1871). An English general. He was the second son of Sir James Scarlett, Baron Abinger, was educated at Trinity College, Cambridge, entered the army, was gazetted major to the Fifth Dragoon Guards in 1830, and commander of the regiment in 1840. When the war with Russia broke out he was given command of the Heavy Brigade and fired his first shot before Sebastopol in 1854. During the battle of Balaklava, on October 25th, Scarlett, receiving news of an attack from the Russians, moved on to Kadiköi, where he was surprised by the enemy, 2000 strong. In order to save his troops from annihilation, Scarlett led 300 of his men up the hill into the centre of the Russian ranks, and, supported a little later by 400 of the remaining squadrons, broke through and scattered their forces. Later in the day Lord Lucan prevented him from making a second charge with his brigade. It was on this occasion that the Light Brigade made its celebrated charge. Scarlett was promoted major-general and made K.C.B. for his services at Balaklava. In 1855 he succeeded Lord Lucan as commander of the British cavalry in the Crimea and did notable work there breaking in the recruits. At the close of the war he was given the command of the Aldershot camp, which he retained until his retirement from active service in 1870.

SCARLET TANAGER, or FIRE-BIRD. See TANAGER; and Colored Plate of SONG BIRDS.

SCARP. The interior slope of a ditch. See FORTIFICATION; REDOUBT.

SCARPA, skär'pä, ANTONIO (1747-1832). An Italian anatomist, born at Motta, near Treviso. He was educated at Padua; in 1772 he was appointed professor of anatomy in Modena, in 1783 at Pavia, where in 1814 he became director of the faculty of medicine. He became one of the greatest clinical surgeons in Europe. Perhaps Scarpa's greatest achievement was to demonstrate that the heart was supplied with nerves. He died in Pavia after being blind for many years. 'Scarpa's triangle' is bounded by the adductor longus, the sartorius, and the crural arch. It is so named because Scarpa first tied the femoral artery in it for popliteal aneurism.

SCARPANTO, skär'pän-tō (Lat. *Carpathus*, Gk. *Κάρπαθος*, *Karpathos*). An island of the Ægean Sea belonging to Turkey, situated midway between the islands of Rhodes and Crete (Map: Turkey in Asia, B 5). It is 31 miles long, 8 miles in extreme breadth. Area, 126 square miles. It has bare mountains, reaching a height of 4000 feet. There are ruins of towns in several places. Population, about 8000, mostly workers in wood. Chief town, Aperi.

SCARPE. In heraldry (q.v.), a diminutive of the bend sinister.

SCARRON, skä'rōn', PAUL (1610-60). A French realistic novelist and burlesque humorist, born in Paris. His well-to-do father was bigoted, his step-mother cruel. One induced him to take orders, the other cheated him of his inheritance. He was educated for the Church. He had a gay youth, was a welcome guest both of the aristocratic salons and of the less prim Marion Delorme and Ninon de l'Enclos. Then he was sent to Le Mans, was taken by his bishop to Rome (1635), and made canon (1636). Symptoms of nervous disease now appeared and made him from 1638 till death a constant invalid and an intense sufferer. "My shins and thighs," he says, "first made an obtuse angle, then a right angle, and at last an acute one. My thighs and my body make another, and since my head bends over on my stomach, I am shaped quite like a Z." In this plight and having to earn his bread, Scarron was taken to Paris, and from 1645 to 1655 he wrote comedies and farces that made him for the moment the unquestioned leader in this field and also gave him intimate knowledge of the theatrical life of the time. Then in 1646 he refreshed his memories of provincial life at Le Mans and began to weave the comic aspects of province and stage into his *Roman comique* (1651-57), many episodes of which have both brilliancy and humor. Soon after the appearance of the first volume (1651) Scarron prepared to emigrate to America, but while recruiting colonists for that end he met Mlle. d'Aubigné, who had just returned thence empty of purse but full of wit and beauty. Mingled sentiment and pity led to their marriage (1652), and there was no more thought of America. Under the care of her, who was to win the love of Louis XIV. as Madame de Maintenon, Scarron lived eight years, editing a comic journal, writing dramas, a travesty of Vergil (1658), and eight remarkable *Nouvelles magi-comiques* (1659), which furnished models for Molière's Tartufe and Harpagon, a plot for his *Ecole des femmes*, and for Sedaine's *Gageure imprévue*, and a title for Beaumarchais's *Barbier de Séville*. Scarron's poetry and drama introduced Spanish and Italian burlesque into France. His fiction did the same; but it marked also an advance in natural character-drawing and in the technique of rapid narration. The popularity of the *Roman comique* was immediate and perennial. It was repeatedly reprinted and many times continued, best by Offray. Good modern editions are by Fournel (Paris, 1857) and France (ib., 1881).

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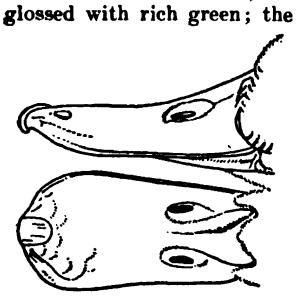
Scarron's *Œuvres* were collected in 10 volumes (Paris, 1737) and in 2 volumes (ib., 1877), and the dramatic works in 1 volume (ib., 1879). There is a translation, *The Comical Works of Scarron*, with an introduction by Jusserand (London, 1892). Consult: Morillot, *Scarron et le genre burlesque* (Paris, 1888); Le Breton, *Le roman au XVIIème siècle* (ib., 1890); Körting, *Geschichte des französischen Romans im XVII. Jahrhundert* (Oppeln, 1891); and Peters, *Scarron und seine spanischen Quellen* (Erlangen, 1893).

SCARTAZZINI, skär'tä-tsē'nē, JOHANN ANDREAS (1837-1901). A Swiss theologian and a Romance scholar, born at Bondo (Grisons) and educated at Basel and Bern. He preached for a time near Bern, then taught Italian in the cantonal school of Chur, was pastor at Soglio from 1875 to 1884, and spent his last years at Fahrwangen (Aargau). He edited Tasso (2d ed., 1882) and Petrarch (1883), but his great contribution to Italian literature was his work on Dante, which includes *Dante Alighieri, seine Zeit, sein Leben und seine Werke* (1869, 2d ed. 1879), *Abhandlungen über Dante* (1880), *Dante in Germania* (1880-83), the excellent *Dante, vita ed opere* (1883, and 1894 under the title *Dantologia*), an edition of the *Divina Commedia* (1874-82), *Prolegomeni* (1890), *Dante-Handbuch* (1892), an edition of the *Commedia* (1893, 2d ed. 1895), the *Enciclopedia Dantesca* (1896-98), *Dante als Geistesheld* (1896), and *Concordanza della Divina Commedia* (1901).

SCAUP (from Icel. *skālp-hæna*, scaup-duck). Any of several ducks of the Northern Hemisphere, of the same genus (Aythya) as that of the canvasback and redhead, and having similar habits. The typical scaup is that of the Old World (*Aythya marila*), represented in North America by a variety (*nearctica*), commonly called 'bluebill,' 'broadbill,' or 'blackhead.' It is 18 inches or more in length. The male has the head, neck, and upper part of the breast and back black; the sides of the neck glossed with rich green; the back white, spotted and striped with black lines; the speculum white. The female has brown instead of black, and old females have a broad white band around the base of the bill. The flesh of the scaup duck is tough, and has a strong fishy flavor. Closely allied but smaller is the leaser scaup, or 'little bluebill,' etc. (*Aythya affinis*), which has the head glossed with purple instead of green. A third species is the ring-necked duck or 'moonbill' (*Aythya collaris*), in which the brown of the fore parts is interrupted by a pale band about the neck. All these breed in the north, but are abundant in the spring and fall throughout the United States on the larger bodies of fresh water, as well as along the coast.



BILL OF A SCAUP.

SCEATTA. A small coin, usually of silver, but sometimes of gold, used in Britain during the seventh century, the earliest type of coin known there after those of the Roman occupation.

SCENES OF CLERICAL LIFE. A group of stories by George Eliot (1858), originally published in *Blackwood's Magazine*, comprising her first attempts in fiction and depicting faithfully a society which she knew well.

SCENIC AND HISTORIC PRESERVATION SOCIETY, AMERICAN. A national organization for the protection of American scenery and the preservation of American landmarks, incorporated by the New York State Legislature in 1895. In 1897 the State of New York, at the instance of the society, bought 33 acres of land around Stony Point, the scene of Gen. Anthony Wayne's exploit in 1779, and intrusted the improvement of the property to the society. In 1900 the State bought about 35 acres at the head of Lake George, in New York State, made famous by events during the French-and-Indian and Revolutionary Wars, which it has erected into a State reservation. In 1903 the society secured favorable action from the New York City Government for the preservation of Fraunces's Tavern, Manhattan, the scene of Washington's farewell to his officers. These illustrate the scope of the society's operations.

SCENT GLANDS (from OF., Fr. *sentir*, to feel, perceive, smell, from Lat. *sentire*, to perceive by the senses; connected with Goth. *sinps*, journey, OHG. *sinnan*, to strive after, Ger. *sinnen*, to perceive). A large and diversified group of glands found in many animals, generally opening into the terminal portion of the intestine near the anus. The secretion of these glands is nearly always repulsive (to man, at least), and in some cases, as, notably, that of the skunk, is employed as a means of defense. The term is more strictly applied to the glands occurring in many carnivora and rodents, which consist of follicles that empty their secretion into small sacs with muscular walls and narrow orifices, placed one on each side of the anus. The civet cat has an anal sac on each side of the vent, as well as two other sacs opening by a common outlet in front of the vent. From the latter sacs is excreted the substance known as civet (see CIVET), which is employed in the composition of perfumes. In the beaver analogous glands are found in both sexes near the genital orifices, in the form of large pyriform sacs, called preputial glands, which furnish the castoreum of commerce. From castoreum is prepared the castor of the pharmacopœia.

SCEPTRE (Lat. *sceptrum*, from Gk. σκῆπτρον, *skēptron*, staff, from σκήπτειν, *skēptein*, to prop, to throw; connected with Skt. *kṣip*, to throw). A staff of some precious material serving from time immemorial as the most notable symbol of royalty. Both in the Old Testament and in Homer, the most solemn oaths are sworn by the sceptre, and Homer speaks of the sceptre as an attribute of kings, princes, and leaders of tribes. The sceptre was in very early times a truncheon pierced with gold or silver studs. Ovid speaks of it as enriched with gems, and made of precious metals or ivory. The sceptre of the kings of Rome, which was afterwards borne by the consuls, was of ivory and surmounted by an eagle. Some sceptres are surmounted by a cross, by a hand in the act of benediction, or by some suitable

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royal emblem, such as the fleur-de-lis of France. The sceptre of the English monarch is cruciform in appearance, and dates from the days of Charles II.

SCHACK, shâk, ADOLF FRIEDRICH, Count (1815-94). A German poet and critic, born near Schwerin. He studied law and entered the service of the Grand Duke of Mecklenburg. During a stay in Berlin Schack perfected himself in Sanskrit, Arabic, and Persian. More scholar than poet, Schack was at his best in his translations, especially the *Spanisches Theater* (1845), *Firdusi* (1865), *Strophen des Omar Chijam* (1878), *Orient und Occident* (1890), and *Englische Dramatiker* (1893). His original verse includes *Gedichte* (1867), the romance *Ebenbürtig* (1876), *Nächte des Orients* (1874), and *Lustspiele* (1891). As a critic his work was distinctly excellent, his chief titles being *Geschichte der dramatischen Litteratur und Kunst in Spanien* (1845-55), *Poesie und Kunst der Araber in Spanien und Sizilien* (1865, 2d ed., 1877), and the historical works *Die Normannen in Sizilien* (1889) and *Mazzini und die italienische Freiheit* (1891). Schack's autobiography appeared in 1887 under the title *Ein halbes Jahrhundert* (Stuttgart, 1894), his collected works in 1891 (2d ed.), and his posthumous poetry, edited by Winkler, in 1896. Consult the sketches by Rogge (Berlin, 1883), Brenning (Bremen, 1885), and Berg (Frankfort, 1896).

SCHADOW, shä'dô, FRIEDRICH WILHELM (1789-1862). A German historical and religious painter. He was the virtual founder of the old Düsseldorf school, born in Berlin, the son of the following, studied painting under Weitsch, and in 1810 proceeded to Rome, where he joined the Nazarites (see PRE-RAPHAELITES), and became a convert to Catholicism. His part in their joint frescoes in the Casa Bartholdi (now in the National Gallery, Berlin) was "Jacob with Joseph's Coat" and "Joseph in Prison." These are the most important works of his Roman period, although his Madonnas and portraits show a greater technical skill, upon the basis of which he was called in 1819 to be professor in the Berlin Academy. His principal work at Berlin was a large "Bacchanal," upon the ceiling of the Royal Theatre; but he also painted a number of Madonnas and other religious subjects and "Poesy," one of his best easel pictures.

His high success as a teacher was the cause of his appointment as director of the Düsseldorf Academy. He entirely reorganized the instruction there, and it was to his teaching that the success and productivity of the Düsseldorf school (q.v.) was chiefly due. Unlike his predecessor Cornelius, he practiced oil painting, rather than fresco, placing greater weight upon color. He favored the historical and the religious picture and was much opposed to the genre and landscape afterwards practiced by his pupils. His principal production during this period was "The Wise and the Foolish Virgins" (1837, Städel Institute, Frankfort); among other religious paintings are the "Four Evangelists" (Werdersche Kirche, Berlin) and "Christ and His Disciples at Emmaus" (National Gallery, ib.).

In 1840 he went to Italy, whence he returned more austere in religion and uncompromising in advocating purely religious painting. His latest works include "Heavenly and Earthly Love," "Piety and Vanity in Their Relation to Religion," and allegorical representations of "Heaven," "Purgatory," and "Hell," after Dante. In 1859 he resigned the directorship of the academy. He died at Düsseldorf. As an author he is well known by his lecture, *Ueber den Einfluss des Christentums auf die bildende Kunst* (Düsseldorf, 1843), and the biographical sketches, *Der moderne Vasari* (Berlin, 1854). Consult Hübner, *Schadow und seine Schule* (Bonn, 1869), and the authorities referred to under DÜSSELDORF SCHOOL OF PAINTING.

SCHADOW, JOHANN GOTTFRIED (1764-1850). An eminent German sculptor, who inaugurated a new epoch in plastic art, marked by the return to the simple truth of nature and to antique models, after a period of mannerism. Born in Berlin, May 20, 1764, the son of a tailor, he became the pupil of Tassaert in 1776 and simultaneously studied drawing at the Academy. Married in 1785, he went to Italy, and was powerfully impressed at Florence by the works of Giovanni da Bologna and Michelangelo, yet more deeply still in Rome by the antique sculptures in the Vatican and the Capitol, which he studied with indefatigable zeal. Having worked temporarily in the studio of Trippel, he found the intercourse with Canova more instructive. In 1786 he won the first prize in the Concorso di Balestra, with the group in terra-cotta "Andromeda Delivered by Perseus," and upon his return to Berlin was elected a member and one of the four rectors of the Academy, and appointed Court sculptor, in 1788. Schadow's most important works date from the next two decades, and in their unpretending simplicity give the full impression of life and individual truth. Chronologically, they include the "Hercules Slaying the Centaur Eurytion" (1789), on the Hercules Bridge; the "Monument of Count von der Mark" (1789-91), in the Dorotheenstadt Church. A number of reliefs of antique subjects, in the various state rooms of the royal palace, belong to the same period. Then followed the statue of "Frederick the Great" (1793) at Stettin, that of "Ziethen" (1794) and that of "Prince Leopold of Anhalt-Dessau" (1800), both at Gross-Lichterfelde (replicas in bronze, Wilhelmsplatz, Berlin). For the Brandenburg gate he modeled the "Quadriga of Victory" (1789-94), the statue of "Mars" (1794), and the 16 metopes of the "Combat Between the Centaurs and Lapithæ" (1794). Of his perfect success in rendering female grace and beauty, the exquisite group of "Crown Princess Louise and Her Sister" (1795-97, Royal Palace, Berlin) is sufficient proof. A splendid specimen of his treatment of the nude form is the life-size reclining figure of a woman (1797), long designated erroneously as the "Nymph Salmacis" by Thorwaldsen. Intimate characterization distinguishes a bronze group of "Frederick the Great with His Greyhounds" (1816), at Sans-Souci. Schadow concluded his monumental plastic work with the statues of "Blücher" (1819), at Rostock, and "Luther" (1821), at Wittenberg, and his last piece in marble was the statuette of a "Girl Reposing" (1826), in the National Gallery, Berlin. Since 1792 he had also fashioned about a hundred portrait busts of the Hohenzollern and other prominent personages, among them those for

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the Walhalla, near Regensburg, including "Frederick the Great," "Charlemagne," "Henry the Fowler," "Copernicus," "Kant," "Wieland," and others, and that of "Goethe" (1816), in the National Gallery. Due credit should be given also to his numerous drawings, ranking with the best of his time, more than 1000 of which are preserved at the Berlin Academy. He published: *Wittenbergs Denkmäler der Bildnerei, Baukunst und Malerei* (1825); *Lehre von den Knochen und Muskeln*, etc. (1830); *Polyklet, oder von den Maszen des Menschen nach dem Geschlecht und Alter* (1834; 5th ed. 1886); and its sequel *Nationalphysiognomien*, etc. (1835; 2d ed. 1867), each with 30 plates. From 1816 to his death, January 28, 1850, he was director of the Berlin Academy, highly gifted and successful as a teacher.

His son and pupil, RUDOLPH (1786-1822), born in Rome, returned thither from Berlin in 1811, and under the influence of Thorwaldsen followed the lines of classicism. He was most successful with genre figures, such as the "Sandal-Binder" (1817), in the Glyptothek at Munich, which also contains his portrait bust of "Vittoria Caldoni" (1820). Most of his works found their way into England. His principal composition, the heroic group of "Achilles Defending Penthesilea" (modeled 1821); was executed in marble by Emil Wolff, for the royal palace in Berlin. Consult: Eggers, in Dohme, *Kunst und Künstler* (Leipzig, 1886); Dónop, in *Allgemeine deutsche Biographie*, xxx. (ib., 1890); and Bode, *Geschichte der deutschen Plastik* (Berlin, 1887).

SCHAFAŘIK, shŏ'fär-zhĕk. A Slavic philologist. See ŠAFAŘIK.

SCHÄFER, shā'fĕr, EDWARD ALBERT (1850—). An English physiologist, born in London and educated in University College. He became assistant professor of physiology in 1874, and was Jodrell professor from 1883 to 1899, when he was named professor of physiology in Edinburgh. Besides valuable papers on muscular structure, on the chemistry of blood proteids, on absorption, and on the rhythm of voluntary contraction, he wrote *A Course of Practical Histology* (1877), and *Essentials of Histology* (1885), and edited Quain's *Elements of Anatomy* (with G. D. Thane, 8th, 9th, and 10th editions), and an *Advanced Text-Book of Physiology by British Physiologists* (1898).

SCHÄFER, KARL (1844—). A German architect, born and educated at Cassel, where he taught in the Polytechnic (1868-70). In 1870 he became university architect in Marburg, whence he removed in 1878 to Berlin. There he was docent in the School of Technology and in 1884-94 professor of mediæval architecture. In 1894 he was appointed to a chair of mediæval architecture in the Karlsruhe Institute of Technology. Schäfer planned the very successful buildings of Marburg University, the Holzhausen Castle near Kirchhain, and the Equitable Building in Berlin. He wrote *Ornamentale Glasmalereien des Mittelalters und der Renaissance* (1881-88, with Rossteuscher), *Holzarchitektur Deutschlands vom 14. bis 18. Jahrhundert* (1884-88), and *Die mustergültigen Kirchenbauten des Mittelalters in Deutschland* (1892 sqq.).

SCHAFF, shäf, PHILIP (1819-93). A distinguished Church historian. He was born at Chur, Switzerland, January 1, 1819; studied at Stuttgart, Tübingen, Halle, and Berlin; traveled in 1841 as private tutor in France, Switzerland, and Italy, and returned to Berlin and lectured on theology 1842-44. On invitation from the German Reformed Church he came to America in 1844 and became professor of theology in the German Reformed Theological Seminary at Mercersburg, Pa. In 1864 he removed to New York City and was secretary of the New York Sabbath Committee till 1869. He lectured at Andover on Church history 1862-67. In 1870 he became connected with Union Theological Seminary first as professor of theological cyclopædia and Christian symbolism (1870-74), next of sacred literature (1874-87), and finally of Church history (1887-93). He died in New York City. His most important works are his *History of the Christian Church* (1858-90), his translation, adaptation, and editing of Lange's *Commentary on the Holy Scriptures* (1864-86), *The Schaff-Herzog Encyclopædia of Religious Knowledge* (3d ed. 1891), and his collecting and introducing of *The Creeds of Christendom* (1877-84). His deepest desire was for the union of Christendom, and his last speech was in its behalf at the Chicago Parliament of Religions (1893). He was one of the founders of the American branch of the Evangelical Alliance and was long its honorary secretary. Consult his *Life* by his son, D. S. Schaff (New York, 1897), which contains a full list of his publications.

SCHÄFFER, shĕf'fĕr, JULIUS (1823-1902). A German musician, born at Krevese, in the Altmark. He studied theology, and later philosophy, at Halle and in Leipzig, but upon becoming intimate with Robert Franz, and through him coming in contact with Schumann, Mendelssohn, Gade, and others, he gave himself up entirely to music. In 1850 he studied under Dehn at Berlin, and five years afterwards became musical director to the Grand Duke at Schwerin, where he founded and conducted the "Schlosskirchenchor." In 1860 he became musical director at the university and conducted at the Singakademie, Breslau, having succeeded Reinecke. Among his works are three books in defense of Franz's "additional accompaniments" to scores by Bach and Handel, namely: *Zwei Beurtheiler von Dr. R. Franz; Fr. Chrysander in seinen Clavierauszügen zur deutschen Händel-Ausgabe;* and *R. Franz in seinen Bearbeitungen älterer Vocalwerke;* excellent choral books; songs and part-songs.

SCHAFFHAUSEN, shäf-hou'zen. The northernmost canton of Switzerland, bounded by the Grand Duchy of Baden, except on the southwest, where the Rhine separates it from the cantons of Zurich and Thurgau (Map: Switzerland, C 1). Area, 114 square miles. The canton forms a part of the Rhine valley. In the northern part are mountainous spurs from Baden. Numerous streams flow toward the Rhine and render even the higher portions of the region cultivable. The products include cereals, vegetables, and wine, and domestic animals of Swabian and Swiss breeds are raised. The manufacturing industries are centred at Schaffhausen (q.v.), the capital. Schaffhausen is one of the most democratic cantons of Switzerland. Its constitution, dating from 1876, and modified in 1895, provides for a legislative assembly (Grosser Rat) elected for four years, at the rate of one

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member for every 500 inhabitants, and an elected executive council of 5 members. The initiative and obligatory referendum are in force. Schaffhausen sends two representatives to the Federal Council. Population, in 1900, 41,514, principally German-speaking Protestants.

SCHAFFHAUSEN. The capital of the canton of the same name in Switzerland, situated on the Rhine at an altitude of 1295 feet, about 25 miles north of Zurich (Map: Switzerland, C 1). The town is quaint and contains many gabled houses dating from the sixteenth and the seventeenth centuries. There are an interesting early-Romanesque basilica dating from the eleventh century, the seventeenth-century town hall, the museum with the town library, and the Imthurneum, containing a theatre, a picture gallery, a concert hall, etc. Above the town rises the massive sixteenth-century tower of Munot, with its fine terrace, and at the western end of the town lies the Fäsenstau Promenade. Schaffhausen is connected by two bridges with the village of Feuerthalen on the opposite bank of the Rhine. The manufactures are of wide range, including various iron and steel products, scientific instruments, machinery, watches, yarns, textiles, pottery, etc. Population, in 1900, 15,400, mostly Protestants. Schaffhausen is mentioned as a city in the twelfth century and soon after became a free city of the Empire. It joined the Swiss Confederation in 1501. Two miles below Schaffhausen are the famous Falls of the Rhine, one of the grand scenic features of Central Europe. In three leaps over the rough ledge the river here descends nearly 100 feet.

SCHÄFFLE, shĕf'le, ALBERT (1831-1903). A German economist and sociologist. He studied theology at Tübingen, and from 1850 to 1860 he edited the *Schwäbischer Merkur* at Stuttgart. Professor of political economy at the University of Tübingen (1860-68), he subsequently became a professor at the University of Vienna. From February until October of 1871 he was Austrian Minister of Commerce. Upon the overthrow of the Ministry he went to Stuttgart, where he devoted himself to literary work. Among his best known publications are *Die Quintessenz des Sozialismus* (1874) and *Die Aussichtslosigkeit der Sozialdemokratie* (1885). His *Bau und Leben des sozialen Körpers* (1875-78, new ed. 1896) undertakes to construct a thoroughgoing sociological system. His other important works are *Die Nationalökonomie* (1861), a third edition of which appeared in 1873 under the title *Das gesellschaftliche System der menschlichen Wirtschaft* (1873), and *Kapitalismus und Sozialismus* (1870).

SCHAFHÄUTL, shäf'hoi-t'l, KARL EMIL VON (1803-90). A German geologist and physicist, whose early writings on acoustics and on the preparation of steel and iron were under a pseudonym, the Latinized equivalent of his name, Pellisov. He was born in Ingolstadt, studied mathematics and mineralogy at Landshut and English methods of puddling and forging iron at Sheffield and in 1843 became professor of geology, mineralogy, and mining in Munich, where, six years afterwards, he was appointed librarian of the university. His most important work was the introduction into Bavaria of what he had learned at Sheffield. Schafhäutl devised many mathematical and physical instruments, of which his areometer, photometer, and phonometer are most valuable. Besides his writings on geology and physics, which appeared in English and German technical reviews, he published on the history of music, to which he especially devoted himself in his later years, *Ein Spaziergang durch die liturgische Musikgeschichte der katholischen Kirche* (1887), and *Abt Georg Josef Vogler* (1888).

SCHALCKEN, shälk'en, GODFRIED (1643-1706). A Dutch genre painter, born in Made. He received his art training under Hoogstraten and in the studio of Gerard Dou. In 1699 he was in England and painted a portrait of William III., now in The Hague Museum (another copy in Amsterdam). But, excepting this and a few other portraits and some historical, mythological, and landscape studies, Schalcken produced small canvases with artificial light effects. Among these, mention may be made of "Old Woman Scouring a Pan," and "Soldier Giving Money to a Woman," in the London National Gallery; "Ceres Seeking Proserpine" and "Old Man Writing," at the Louvre; "Girl Blowing Out Taper," at Munich; "Girl Reading Letter," in the Dresden Gallery; and "Toilet by Candle," at The Hague, all with wonderfully mellow treatment and warm coloring. His sister, MARIA, and his nephew, JAKOB (1684-1722), painted so much in Godfried's manner that their work is often confused with his.

SCHALKE, shäl'ke. An industrial commune of Prussia, 7 miles north of Essen, with important coal mines, iron and steel works, machine shops, coke ovens, tin-plate works, chemical factories, glass and mirror works. Population, in 1900, 26,077.

SCHALL, shäl, JOHANN ADAM VON (1591-c.1665). A celebrated Jesuit missionary to China. He was born of noble family at Cologne in 1591, entered the Society of Jesus in 1611, and went as a missionary to China in 1617. He succeeded not only in forming a flourishing mission, but was ultimately invited (1631) to the Imperial Court at Peking, where he was intrusted with the compilation of the calendar and the direction of the public mathematical school, being himself created a mandarin. Through this favor with the Emperor Schall obtained an edict which authorized the building of Roman Catholic churches and the liberty of preaching throughout the Empire, and in 14 years the Jesuit missionaries in the several provinces are said to have received into the Church 100.000 proselytes. On the death of this Emperor (1661), however, a change of policy fatal to the prospects of Christianity took place. Schall was thrown into prison and sentenced to death, and although released on May 18, 1665, he had suffered so much that he died soon after. For a portrait of him in the costume of a mandarin, see illustration under COSTUME, ECCLESIASTICAL. Consult Platzweg, *Lebensbilder deutscher Jesuiten in auswärtigen Missionen* (Paderborn, 1882).

SCHAMYL, shä'mil. A patriot chief of the Caucasus. See SHAMYL.

SCHANDORPH, shän'dôrp (properly **SKAMDRUP**), SOPHUS (1837-1901). A Danish poet and novelist, who excelled in portraying the life of the Danish middle and lower classes. Born and educated in Ringsted, he studied first theology and then the Romance languages. He possessed a keen sense of humor and remarkable

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powers of observation. One of his best novels is *Smaafolk* (1880), the story of a peasant girl beset by the temptations of a large city. His other works include *Uden Midtpunkt* (1878), *Thomas Fris' Histoire* (1881), *Skovfagedes börnene* (1884), *Det gamle apothek* (1885), *Fra Isle de France og fra Sorö* (1888), and *Stillelius Folk* (1892).

SCHANZ, shänts, GEORG (1853—). A German economist, born in Grossbardorf and educated in Munich, Würzburg, and Strassburg. He was employed in the Statistical Bureau in Munich, became professor at Erlangen in 1880, and in 1882 was called to the chair of economics in Würzburg. In 1884 he became editor of the *Finanzarchiv*, and it is with finance and the history of commerce that his works especially deal. He wrote: *Die deutschen Gesellenverbände* (1877); *Englische Handelspolitik gegen Ende des Mittelalters* (1881); *Beiträge zur Frage der Arbeitslosenversicherung* (1895-1902).

SCHANZ, MARTIN VON (1842—). A German classical philologist, born at Uechtelhausen, in Bavaria. In 1875 he became professor of classical philology in the University of Würzburg. His studies were chiefly directed to Plato, historical Greek syntax, and the history of Roman literature. His most important published works are: *Beiträge zur vorsokratischen Philosophie* (1867); *Studium zur Geschichte des Platonischen Textes* (1874); *Platonis Opera* (1st critical ed. 1874); and numerous editions of separate dialogues. After 1882 he edited *Beiträge zur historischen Syntax der griechischen Sprache.* His *Römische Litteraturgeschichte* (1898, et seq.) is important for its comprehensive survey of every field, its objectivity and impartiality, and the excellence of its characterizations.

SCHAPER, shä'pēr, FRITZ (1841—). A German sculptor, born at Alsleben, Prussian Saxony; pupil of the Berlin Academy and of Albert Wolff; instructor at the academy in 1875-90 and elected a member of it in 1880. Besides some figures for the "War Monument" at Halle, he produced the statues of Bismarck (1879) and Moltke (1881, both at Cologne), Gauss (1880, Brunswick), Lessing (1881, Hamburg), Krupp (1889, Essen), Liebig (1890, Giessen), Blücher (1893, Caub), the monuments to Goethe (1880, Berlin) and Luther (1890, Erfurt); the equestrian statue of William I. (1901, Aix-la-Chapelle); and an heroic-size "Victory" (1885, Arsenal, Berlin). To the adornment of Sieges-Allée in Berlin he contributed the statue of the Great Elector (1901).

SCHARF, shärf, JOHN THOMAS (1843-98). An American antiquary and historian, born in Baltimore, Md. He served in both the Confederate army and navy, was several times wounded, and once narrowly escaped being put to death as a spy. Later he engaged in journalism and in Baltimore was at different times editor of the *Evening News*, *Sunday Telegram*, and *Morning Herald.* He devoted much attention to history, and made a collection of many thousands of documents, pamphlets, and other historical material, which he gave in 1891 to Johns Hopkins University. His publications include: *Chronicles of Baltimore* (1874); *History of Maryland* (3 vols., 1879-80); *History of Baltimore City and County* (1881); *History of Western Maryland* (2 vols., 1882); *History of Philadelphia* (3 vols., 1884); *History of the Confederate State Navy* (1887); and *History of Delaware* (1888).

SCHARNHORST, shärn'hôrst, GERHARD JOHANN DAVID VON (1755-1813). A Prussian general, founder of the modern Prussian military system. He was born in Hanover. He entered the military service of his native State in 1778, was teacher in the artillery school of Hanover about 1780, and was engaged in the campaigns in Flanders in 1793-95. In 1801 he was called into the Prussian service and became director of the Prussian military school. He served in the field in the disastrous campaigns of 1806-07, and was then made president of the commission charged with the reorganization of the Prussian army and head of the War Department. Working in harmony with the other regenerators who came to Prussia in her need, he accomplished this in spite of the distrust and opposition of the old-time Prussians. Universal service was not secured until his death, but he laid down the principles and prepared the way for its adoption. Enrollments of foreigners were abolished, corporal punishments were limited to flagrant cases of insubordination, promotion for merit was established, and the military administration organized and simplified. The organization of the *Landwehr* or reserve was begun. So promptly were the results of this work seen that the Prussian army, which had been so ineffective before Tilsit, was able to play an important part in the final campaigns against Napoleon. Scharnhorst was wounded in the battle at Grossgörschen May 2, 1813, and died at Prague June 28th. Consult his biography by Klippel (3 vols., Leipzig, 1869-71), which is devoted especially to his reforms and their results.

SCHARWENKA, shär-vĕŋ'kä, PHILIPP (1847—). A German pianist and composer, born in Samter, Posen, and brother of Xaver Scharwenka. He was educated at the Posen Gymnasium, and in 1865 was enrolled as a pupil of the Kullak 'Neue Akademie der Tonkunst' in Berlin, where he was a special pupil of Würst and H. Dorn. In 1870-81 he taught theory and composition at the academy and then took up a similar position at his brother's conservatory. His compositions are regarded highly and include many charming numbers for orchestra, pianoforte, violin, 'cello, and voice; the choral works, *Herbstfeier* Op. 44, and *Sakuntala*, for solo and orchestra; two symphonies; *Arkadische Suite;* and a festival overture, *Dorper-Tanzweise*, for chorus and pianoforte.

SCHARWENKA, XAVER (1850—). A German composer and pianist, born at Samter. He was educated at Kullak's Academy in Berlin under Kullak and Würst. In 1874 he began a series of very successful tours throughout Europe and America, and in 1881 he established his conservatory in Berlin. Ten years later he removed to New York City and became director of the Scharwenka Conservatory there. His Berlin school meanwhile amalgamated with that of Karl Klindworth, and in 1898 he returned to Germany and assumed charge of the Klindworth-Scharwenka Conservatory. His works include the opera *Mataswintha* (1896), a symphony in C minor, and considerable chamber and pianoforte music. Perhaps

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his most popular compositions have been his Polish dances.

SCHÄSSBURG, shĕs'bōōrk (Hung. *Segesvár*). A royal free city, and the capital of the County of Gross-Kokel (Nagy-Küküllö), Hungary, on the Great Kokel, 80 miles by rail northwest of Kronstadt (Map: Hungary, J 3). The town has a Protestant gymnasium, with a free library and museum, and a Catholic normal school. It is noted as the scene of the defeat of the Hungarian army by the Russians, July 31, 1849, the celebrated poet Petöfi (q.v.) being among the Hungarian dead. Population, in 1900, 10,857.

SCHÄUFELEIN, shoi'fe-lĭn, HANS LEONHARD (c.1480-1540). A German painter, born in Nuremberg. He became the pupil and assistant of Dürer, whom he imitated. His treatment of drapery is peculiarly good, but his own manner is often rather careless. His best works, apart from drawings for woodcuts, among which those illustrating the *Theuerdank*, his designs for a wedding dance, and cuts for the Bible are most important, are the following paintings: "The Dying Virgin" (two subjects), "Coronation of the Virgin," "Christ on the Sea of Galilee," "Crowned with Thorns," "On the Cross," and "Mount of Olives," in the Munich Pinakothek; a "Visitation," in the Dublin Gallery; and two portraits belonging to the Duke of Northumberland.

SCHAUFFLER, shouf'lĕr, WILLIAM GOTTLIEB (1798-1883). A Protestant missionary in Turkey. He was born at Stuttgart, Germany, and went with his parents at the age of six to Odessa, Russia. Having decided to become a missionary, after a brief visit to Turkey he came to America and after four years of study at Andover was ordained in 1831 and sent by the American Board to Paris to study Arabic and Persian with De Sacy, and Turkish with Prof. Kieffer. He went to Constantinople and preached in German, French, Spanish, Turkish, and English. By appointment of the British and Foreign and American Bible societies he devoted himself to the translation of the Bible into the Turkish language. He published an ancient Spanish version of the Old Testament, revised by himself, with the Hebrew original, in parallel columns, a grammar of the Hebrew language in Spanish, and a Hebrew and Chaldee lexicon of the Old Testament in the same language; also *Meditations on the Last Days of Christ*, discourses delivered in Constantinople (1837). He returned to America in 1877, and died in New York City. Consult his *Autobiography* (New York, 1887). His son, Rev. A. F. Schauffler, born in Constantinople, has been for many years a promoter of city missions in New York City.

SCHAUMBURG-LIPPE, shoum'bōōrk lĭp'pe. A principality and constituent State of the German Empire, bounded by the Prussian provinces of Hanover and Westphalia and covering an area of 131 square miles (Map: Germany, C 2). Its surface is somewhat mountainous in the north and well wooded. Agriculture and gardening are pursued actively in the southern part, and coal is mined in the east. The chief manufacture is linen. The principality is represented by one member in the Bundesrat and returns one Deputy to the Reichstag. Population, in 1890, 39,163; in 1900, 43,132, almost exclusively Protestants. Capital, Lippe. The ruling dynasty was founded in 1640 by a cadet of the Lippe family, who inherited the countship of Schaumburg. The State was created a principality in 1807. In 1866 it joined the North German Confederation and in 1871 became a member of the German Empire.

SCHECHTER, shĕk'tĕr, SOLOMON (1847—). A distinguished Jewish scholar. He was born at Fokshani, Rumania, and studied at Vienna and later at Berlin. Under the patronage of the Montefiore family he went to England, where his literary studies began. In 1892 he became reader in Rabbinic at Cambridge University. In 1894 he visited America to lecture at Gratz College, Philadelphia, upon "Some Aspects of Jewish Theology." His discovery in 1896 of a page of the Jewish original of Ecclesiasticus (*Ben-Sira*) led to a visit to Cairo to examine the Geniza (or store-chamber for disused books) of the Jewish synagogue, and he was enabled to bring back the whole collection, consisting of 80,000 pieces, which he presented to his university. Cambridge rewarded him with the degree of LL.D., and with the position of curator of Oriental literature. He also received the appointment to the Hebrew professorship at University College, London. In 1901 the Jewish Theological Seminary in New York was reorganized and endowed on condition of Dr. Schechter's becoming its president; he accepted the offer and came to New York in the spring of 1902. His best known work is his publication with Dr. C. Taylor of *The Wisdom of Ben-Sira* (1899), the fruits of the Geniza fragments. Other important works are *Abot de Rabbi Nathan* (1887), *Studies in Judaism* (1896), *Midrash-Hag-gadol* (vol. i., 1902), *Saadyana* (1903).

SCHEEL, shāl, HANS VON (1839-1901). A German economist and statistician, born in Potsdam. He studied at Halle, Jena, and Berlin, in 1868 was appointed to the post of assistant to Hildebrand in the Statistical Bureau at Jena, taught at the Agricultural School at Proskau 1869-71, became professor at Bern in 1871, and Director of the German Statistical Bureau at Berlin in 1891. His works include *Socialismus und Kommunismus*, *Politische Oekonomie als Wissenschaft*, *Die Erwerbseinkünfte des Staats* (in Schönberg's *Handbuch*, 4th ed., 1896), *Die Theorie der sozialen Frage* (1871), *Eigentum und Erbrecht* (1877), *Progressive Besteuerung* (1875), and a version of Ingram's *Present Position and Prospects of Political Economy* (1879), and publications on statistics. Consult Kollmann, *Hildebrands Jahrbuch* (1902, vol. lxxviii., pp. 577-97).

SCHEELE, shā'le, CARL WILHELM (1742-86). An eminent Swedish chemist, born at Stralsund. In 1767 he settled at Stockholm as an apothecary, and in 1770 removed to Upsala. It was during his residence at Upsala that he carried on those investigations in chemical analysis which proved so fruitful in important and brilliant discoveries. In 1777 he removed to Köping. The chief of his discoveries were tartaric acid (1770), chlorine (1774), baryta (1774), oxygen (1774, independently of Priestley), and glycerin (1784). In experimenting on arsenic he discovered the arsenite of copper, which is known as a pigment under the name of *Scheele's green* or *mineral green*. In 1782 he succeeded in obtaining, for the first time, hydrocyanic acid in a separate form. The mode and results of his various investigations were communicated from time to time, in

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the form of memoirs, to the Academy of Stockholm, of which he was an associate. A complete edition of his works was published by Hermbstädt (Berlin, 1793). Consult: Hays, *The Life Work of Carl Wilhelm Scheele* (New York, 1884); Cap, *Scheele, chimiste suédois* (Paris, 1863); Thorpe, "Scheele," in *Nature* for 1892; Nordenskjöld, *Nachgelassene Briefe und Aufzeichnungen von Carl Wilhelm Scheele* (Stockholm, 1892).

SCHEELE, Knut Henning Gezelius von (1838—). A Swedish Lutheran theologian, born in Stockholm and educated at Upsala. There he became docent in 1865 and professor in 1879, and in 1885 was made Bishop of Wisby. In 1893, on the tercentenary of the Upsala decree, he was the King's representative to the United States, and in 1901 represented his university and nation at the Yale Bicentennial. His works on theological symbolics (1885) and on the Church Catechism (1886) were published in German versions.

SCHEELITE (named in honor of Carl Scheele, who first discovered tungstic acid in the mineral). A mineral calcium tungstate crystallized in the tetragonal system. It has a vitreous lustre, and runs in color from white, through yellow, to red and green. It occurs with crystalline rocks, tin ores, and various tungsten minerals, and is found in Bohemia, Saxony, the Tyrol, Hungary, Chile, and in the United States at various localities in Connecticut, North Carolina, Nevada, and Colorado. It finds some use in the manufacture of tungstic acid, especially as the metal tungsten is being more and more employed in the manufacture of steel. Its use has also been suggested in the preparation of glazes for porcelain, but without great success.

SCHÉFER, shā'fär', Charles (1820-98). A French diplomat and Orientalist, born in Paris and educated at the Ecole Spéciale des Langues Orientales Vivantes. He entered the Foreign Office and served as dragoman in Jerusalem, Smyrna, Alexandria, and Constantinople. In 1857 he became professor of Persian in Paris, succeeding Quatremère; and ten years afterwards became president of the Ecole Spéciale des Langues Orientales Vivantes, whence, after more important service in the East in 1860 and 1862, he was transferred to the Collège de France. Schéfer edited many Persian texts and a Persian chrestomathy (1883-85), and edited and translated into French a great mass of material bearing on the history and early exploration of Central Asia, the most important of which was included in the *Recueil de voyages et de documents pour servir à l'histoire de géographie* (with Cordier, 1882-97). His collection of manuscripts is in the Bibliothèque Nationale.

SCHEFER, shā'fĕr, Leopold (1784-1862). A German poet and novelist, born at Muskau. His works include: *Vigilien* (1842); *Gedichte* (1846); the didactic and religious *Laienbrevier* (1834), one of his best works; *Weltpriester* (1846); *Hafis in Hellas* (1853). Some of his novels are *Kleine Romane* (1837-39), *Graf Promnitz* (1842), and *Achtzehn Töchter* (1847).

SCHEF'FEL, Joseph Viktor von (1826-86). A German poet and novelist, born at Karlsruhe, February 16, 1826. He studied law, philology, and literature at Heidelberg, Munich, and Berlin, served judicially at Säckingen (1850) and Bruchsal (1852), traveled in Italy, Switzerland, and France, and from 1857 to 1859 was librarian at Donaueschingen. In 1864 he settled permanently at Karlsruhe. His first book, *Der Trompeter von Säckingen*, was written at Capri and Sorrento in 1852, and is the most popular German epic of the century; it is half playful, half melancholy, wholly romantic, and with the realism of fond memories. His historical novel *Ekkehard*, written at Saint Gall and Heidelberg (1854-55), and based on systematic investigation, is a blending of history and poetry, vivid and faithfully picturesque. Soon afterwards he published *Gaudeamus*, a collection of student-songs. After 1857 Scheffel's health began to give way and his spirits with it. His later poems, tales, and novels, *Frau Aventiure* (1863), *Juniperus* (1881), *Der Heini von Steier* and *Hugideo* (1884), never attained the popularity of his earlier works.

SCHEF'FER, *Fr. pron.* shĕf'fär', Ary (1795-1858). A French painter of the romantic school. He was born at Dordrecht, Holland, February 12, 1795. He studied drawing at Lille and in 1811 went to Paris, where, in the studio of Guérin, he had Géricault and Delacroix for fellow students, and with them defied the ultra-classical teachings of Guérin. He preserved his connection with the new romantic movement in the expression of sentiment, but in execution he aimed more for purity of form. The three classes of subjects affected by him serve in a general way to divide his life into three periods. His attention was first attracted to scenes from real life, in the depiction of which he showed his sympathy with suffering, like "The Soldier's Widow" (1821); "Death of Géricault" (1824), now in the Louvre; "Orphans at the Tomb of Their Mother" (1824); "The Suliote Women" (1827). His second period shows him absorbed in ideal scenes drawn from the works of Goethe and Schiller, Byron and Dante. Among these are "Count Eberhard," in the Louvre; the "Submission of Wittekind" and the "Battle of Zülpich," in the Versailles Museum. In 1830 he painted the first of his series dealing with Marguerite. To this subject he frequently returned, the final one of the series, "Marguerite at the Fountain," being painted in 1858. The third period, characterized by his religious subjects, is not distinctly marked off from the second, for he began the religious pictures with the "Christus Consolator" (1837), now in the Museum Fodor, Amsterdam. After 1840 he was largely occupied with sacred themes and reached his highest achievement in "Christ Weeping Over Jerusalem," "Christ Tempted of Satan," and the "Christ of the Reed."

The taste of recent years has deprived Scheffer of the high place he once occupied when the illustrative qualities of art were more in favor. Consult: His *Life* by Mrs. Grote (London, 1860); *Im-Thurn* (Nîmes, 1876); and Vitet, *Ary Scheffer Album* (Berlin, 1861).

SCHEF'FLER, Johann. A German poet. See Angelus Silesius.

SCHEHE'RAZADE. In the *Arabian Nights*, the wife of Schahriah, Sultan of India, to whom she relates a story each night for a thousand and one nights, and by exciting his interest escapes the usual fate of his wives.

SCHEINER, shī'nĕr, Christoph (c.1575-1650). A German astronomer, born at Wald, in

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Swabia. He was professor of Hebrew and mathematics at Freiburg, and from 1610 to 1616 at Ingolstadt, and after several years in Rome became rector of the Jesuit College of Neisse in Silesia. In his *Tres Epistolæ ad Marcum Velserum* (1612), Scheiner claimed to have seen sun spots as early as March, 1611, and thus aroused the enmity of Galileo, whom Scheiner further provoked by upholding the old thesis of a 'stable' earth and a 'mobile' sun (1651). His great work on the sun, containing the results of about two thousand observations (made with an equatorial telescope of the type now called Sisson's), was the *Rosa Ursina* (1630). Scheiner invented a helioscope and a pantograph.

SCHEINER, JULIUS (1858—). A German astronomer, born in Cologne and educated at Bonn. He became assistant at the astrophysical observatory in Potsdam in 1887 and its observer-in-chief in 1898, three years after his appointment to the chair of astrophysics in the University of Berlin. Scheiner paid special attention to celestial photography and wrote *Der Lichtwechsel Algols* (1882), *Spektralanalyse der Gestirne* (1890), *Ausmessung des Orionnebels nach photographischen Aufnahmen* (1896), *Strahlung und Temperatur der Sonne* (1899), and *Bau des Weltalls* (1901). In 1899 he began the publication of the *Photographische Himmelskarte, Zone + 31° bis + 40° Deklination.*

SCHELDT, skĕlt (Dutch *Schelde*, Fr. *Escaut*). A river of Belgium. It rises in France in the Department of Aisne and flows first north past Valenciennes into Belgium, then northeast past Ghent to Antwerp, below which city it empties into the large, branching estuary which merges with the Rhine delta and opens by several wide channels into the North Sea through Southwestern Holland (Map: Belgium, C 3). Its total length is 267 miles, and it is navigable 210 miles, while below Antwerp it is accessible to the largest ships. A system of canals connects it with the chief cities of Belgium and Northern France. The Dutch monopolized the navigation of the lower Scheldt, and levied a toll on foreign vessels until the river was made free by the Treaty of Brussels in 1863.

SCHELLING, shĕl'ĭng, FRIEDRICH WILHELM JOSEPH VON (1775-1854). A German philosopher. He was the son of a country clergyman, and was born at Leonberg, in Württemberg. He studied at Tübingen and Leipzig, and in 1798 was called to be professor extraordinarius in Jena. Here he found himself in a remarkable social and literary circle, comprising among others the brothers Schlegel with their wives, Tieck, Steffens, and Novalis. With Goethe, too, he was on good terms, while Schiller's philosophical views repelled him. Schelling's philosophical tendencies had been originally determined by Fichte; in fact, he was at first an enthusiastic advocate of the Fichtean idealism, and his earliest writings, *Ueber die Möglichkeit einer Form der Philosophie überhaupt* (1795), and *Vom Ich als Princip der Philosophie* (1795), were composed in this spirit. Gradually, however, Schelling diverged from his master, who soon came to seem to him one-sided. The first result of his departure from Fichte's view was the once famous *Identitätsphilosophie*, which attempted to show that 'subject' and 'object,' the 'ideal' and the 'real' are completely undifferentiated in the absolute, and that in nature there is a preponderance of the objective, while in consciousness there is a preponderance of the subjective. The 'philosophy of identity' reminds one of Spinozism (see SPINOZA) in maintaining a featureless ground of all existence. It differs from Spinozism in regarding the subjectives and the objectives as everywhere present together in the phenomenal world, but with varying preponderance of the two elements. The principal works in which this view is more or less completely developed are: *Ideen zu einer Philosophie der Natur* (1797); *Von der Weltseele* (1798); *Erster Entwurf eines Systems der Naturphilosophie* (1799); and *System des transcendentalen Idealismus* (1800). In 1803 he was called to Würzburg as professor of philosophy. Here his views underwent another change. He gave up the philosophy of 'identity,' and began to champion a mystical view, according to which all finitude is the result of a fall from the absolute—a fall the effects of which the course of history has to repair. This theory is first broached in *Philosophie und Religion* (1804). In his later works, *Philosophische Untersuchungen über das Wesen der menschlichen Freiheit* (1809), *Denkmal der Schrift Jacobis von den göttlichen Dingen* (1812), and *Ueber die Gottheiten von Samothrake* (1815), he became more and more theosophical. He was now strongly under the influence of Bruno (q.v.) and Böhme (q.v.), and maintained that within the absolute there is a dark irrational ground, which gradually becomes clarified, thus giving development to the idea of God. Meanwhile, in 1806, he had gone to Munich as member of the Academy of Arts. From 1820 to 1826 he lectured at Erlangen. In 1827 he was elected professor at the newly established University of Munich, and fourteen years later he went to Berlin as member of the Academy of Science. This position carried with it the privilege of lecturing in the University of Berlin. Between 1815 and 1842 Schelling published only two minor productions. This was due to the fact that a most formidable adversary to him had arisen in his old college friend Hegel (q.v.), who, though older, had at first been an ardent disciple of Schelling's. During the reign of Hegel in the world of German philosophy Schelling preserved a silence which was not broken till 1834, three years after Hegel's death; then he wrote a preface to Becker's translation of one of Cousin's writings. In this preface he criticised Hegel's views as being too exclusively idealistic and as giving no recognition to the empirical side of reality. He died at the baths of Ragatz, in Switzerland, August 20, 1854.

Schelling's complete works were published by his son K. F. A. Schelling (Stuttgart and Augsburg, 1856, et seq.). The second part contains his Berlin lectures. For Schelling's life, see Plitt, *Aus Schellings Leben in Briefen* (Leipzig, 1869-70). Kuno Fischer, in the 6th volume of his *Geschichte der neuern Philosophie*, gives a full biography in addition to an account of his philosophy. See also Watson, *Schelling's Transcendental-Idealism* (Chicago, 1883); A. Seth (Pringle Pattison), *The Development from Kant to Hegel* (London, 1882); Koeber, *Die Grundprincipien der Schellingschen Naturphilosophie* (Berlin, 1882); Groos, *Die reine Vernunftwissenschaft* (Heidelberg, 1889); also the histories of philosophy by Ueberweg-Heinze, Höffding, Windelband, and Bergmann.

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SCHEM, shĕm, ALEXANDER JACOB (1826-81). An American statistician. He was born in Westphalia, and, after studying at the universities of Bonn and Tübingen, edited Westphalian newspapers until 1851, when he came to the United States. Here he was engaged as professor of Hebrew and modern languages at Dickinson College (1854-60), but resigned in 1860 to devote himself to literature. From 1874 until his death he was assistant superintendent of schools in New York. He edited statistical almanacs for 1860 and 1868-69; published a *Latin-English School Lexicon* (with Rev. George R. Crooks, 1857); a *Cyclopædia of Education* (with Henry Kiddle, 1877); and was one of the editors of *The Methodist* and of *The Methodist Quarterly Review*. He edited the *Deutsch-Amerikanisches Conversations-Lexicon* (12 vols.).

SCHEMNITZ, shĕm'nĭts (Hung. *Selmecz-bánya*). A royal free city and the capital of the County of Hont, Hungary, in a narrow mountain gorge, 66 miles north of Budapest (Map: Hungary, F 2). There are six suburbs. The academy for mining and woodcraft, embracing collections of minerals and a chemical laboratory, is the chief architectural feature. There are a ruined castle and a Piarist seminary. Cigars and shoes are manufactured. Schemnitz is famous for its mines, which extend under the town, and produce gold and silver, as well as copper, iron, and sulphur. It was made a free royal city in the twelfth century. Population, in 1900, 16,370.

SCHENCK, skĕŋk, ROBERT CUMMING (1809-90). An American soldier, political leader, and diplomat, born at Franklin, O. He graduated at Miami University in 1827, later studied law, and was admitted to the bar in 1831. In 1851-53 he was Minister to Brazil. While in South America he negotiated treaties between the United States and the Argentine Republic, Uruguay, and Paraguay. Upon the outbreak of the Civil War he was appointed a brigadier-general of volunteers. In 1861 he aided in clearing the mountains of West Virginia of Confederates, and the next spring he commanded the Federal right wing at Cross Keys. At the second battle of Bull Run he led his troops with the utmost gallantry and was severely wounded. He was then promoted to the rank of major-general of volunteers, but resigned his commission in 1863. He was a member of Congress from 1863 to 1870, and was successively chairman of the Committee on Military Affairs and chairman of the Committee on Ways and Means. In 1871 he was a member of the Joint High Commission which drew up the Treaty of Washington, and was Minister to England from 1871 to 1876, when he resigned in consequence of accusations made against him in connection with the Emma Silver Mine fraud. Subsequent investigations cleared him of all suspicion of complicity.

SCHENECTADY, skĕ-nĕk'tȧ-dĭ. The county-seat of Schenectady County, N. Y., 17 miles northwest of Albany; on the Mohawk River and the Erie Canal and on the New York Central and Hudson River, the Delaware and Hudson, and the Fitchburg railroads (Map: New York, F 3). It rises gradually from the Mohawk River. The more elevated section is principally residential, and has the grounds and buildings of Union College (q.v.), a non-sectarian institution opened in 1795. Noteworthy are the court house, city hall, Van Curler Opera House, the Public Library, high school building, and Ellis Hospital. Schenectady is important industrially. In 1900, $6,517,864 capital was invested in its various manufacturing establishments, whose output was valued at $9,288,387. There are large electrical works, locomotive works, foundries and machine shops, bottling works, and manufactories of patent medicines, brooms, and brushes. The government, under the revised charter of 1897, is vested in a mayor, chosen biennially, and a unicameral council, and in administrative officials. For maintenance and operation the city spends annually about $400,000, the principal items being: Schools, $85,000; interest on debt, $60,000; water works, $60,000; municipal lighting, $30,000; fire department, $30,000; streets, $30,000; police, $30,000. The water works, which represent an outlay of $1,236,610, are owned and operated by the municipality. The population in 1890 was 19,902; in 1900, 31,682.

Schenectady was settled in 1662 by Arendt Van Corlear, on the site of the great Mohawk 'Castle' and capital of the Five Nations, Schonowe. On February 8, 1690, the French and Indians massacred 60 and captured between 80 and 90 of its 250 inhabitants, and destroyed 60 of its 66 houses. In 1748 another massacre occurred in its immediate vicinity. Schenectady was chartered as a borough in 1765 and became a city in 1798. In 1819 a large part of the town was destroyed by fire. Consult: Howell and Munsell, *History of Schenectady County* (Albany, 1886), and a sketch in Powell, *Historic Towns of the Middle States* (New York, 1899).

SCHENK, shĕŋk, AUGUST (1815-91). A German botanist and geologist, born at Hallein. After being docent in Munich, and professor in Würzburg, he was from 1868 to 1887 professor at Leipzig. On prehistoric flora Schenck was one of the greatest of German authorities. He wrote *Beiträge zur Flora der Vorwelt* (1863), *Fossile Flora des Keupers und der rätischen Formation* (1864), *Fossile Flora der Grenzschichten des Keupers und Lias Frankens* (1865-67), and in Richthofen's *China* (1882), a summary of the flora from the anthracite and Jurassic formations.

SCHENK, JOHANN (1753-1836). An Austrian composer, born at Wiener-Neustadt. In 1778 he composed a mass, which became popular throughout Germany, and in 1785 his first operetta, *Die Weinlese*, was produced at Vienna. This was followed by nearly a dozen others of similar character, of which the most important was *Der Dorfbarbier* (1796).

SCHENKEL, shĕŋk'el, DANIEL (1813-85). A Swiss theologian, born at Dögerlin, in the Canton of Zurich. After studying at Basel and Göttingen, he lectured and taught at Basel in 1838-41, and returned there in 1849 as professor and member of the Church Council, having in the meanwhile officiated as first parish priest at Schaffhausen. In 1851 he became professor, director of the seminary, and university chaplain at Heidelberg. Of his numerous writings the following partake essentially of the character of mediatory theology: *Das Wesen des Protestantismus* (1845-51); *Gespräche über Protestantismus und Katholicismus* (1853); *Der Unionsberuf des Protestantismus* (1855); and *Die Reformatoren und die Reformation* (1856). A transition to

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liberal doctrines distinguishes *Die christliche Dogmatik vom Standpunkt des Gewissens* (1858-59). In 1863 he participated in the foundation of and presided over the German-Protestant Union, whose principles were elucidated in his *Christentum und Kirche im Einklang mit der Kulturentwicklung* (1867-72), and in *Der deutsche Protestantenverein und seine Bedeutung in der Gegenwart* (1871). Much hostility was excited by his *Charakterbild Jesu* (1864, 4th ed. 1873). His subsequent publications include: *Friedrich Schleiermacher* (1868); *Luther in Worms und in Wittenberg* (1870); and *Das Christusbild der Apostel und der nach-apostolischen Zeit* (1879). He also edited the *Bibellexikon* (5 vols., Leipzig, 1869-75).

SCHENKENDORF, shĕŋk'en-dôrf, MAX VON (1783-1817). A German poet, born in Tilsit and educated at Königsberg. During the War of Liberation, in which he took an active part, Schenkendorf was associated with Arndt and Körner in the writing of patriotic songs. His poems were published as *Gedichte* (1815), *Poetischer Nachlass* (1832), and *Sämtliche Gedichte* (1837 and 1871). For his life, consult Hagen (Berlin, 1863) and Knaake (Tilsit, 1890).

SCHERER, shâ'râr', EDMOND (1815-89). A French theologian and literary critic. He was born in Paris, studied theology in England and Strassburg, and in 1845 was appointed professor of exegesis at Geneva. Owing to the changes in his religious convictions, he resigned his professorship in 1850, and in 1860 removed to Versailles, where he headed a liberal movement in the French Protestant Church. After the establishment of the Republic he was elected, in 1871 a member of the National Assembly, and in 1875 a life Senator. His publications include: *Mélanges de critique religieuse* (1860); *Mélanges d'histoire religieuse* (1864); *Etudes critiques sur la littérature contemporaine* (1863-95), of which George Saintsbury translated *Essays on English Literature* (London, 1891); and biographies of Alexander Vinet (1853), Diderot (1880), and Melchior Grimm (1887). Consult his *Life* by Gréard (Paris, 1890).

SCHERER, shâ'rĕr, WILHELM (1841-86). A German critic and literary historian. He was born in Berlin, studied there and at Vienna, and, after holding professorships at Vienna and Strassburg, was in 1877 appointed professor of the history of modern German literature at Berlin. In 1874 he had founded at Strassburg with Ten Brink the valuable series, *Quellen & Forschungen zur Sprach- und Kulturgeschichte der germanischen Völker*. Scherer's great work was the *Geschichte der deutschen Litteratur* (1883, and often; Eng. tr. 1886), which is marked by scientific method, by grasp of the development of national literature, and by clarity of style. Besides, he wrote *Deutsche Studien*, on the eleventh and twelfth centuries (1870-78; 2d ed. 1891), a *Geschichte der deutschen Dichtung* in the same period (1875), *Zur Geschichte der deutschen Sprache* (1868), *Anfänge des deutschen Prosaromans* (1877), *Jakob Grimm* (2d ed. 1885), and *Aus Goethes Frühzeit* (1879).

SCHERMAN, shĕr'mân, LUCIAN (1864—). A German Orientalist, first docent, and in 1901 extraordinary professor of Sanskrit language and literature in Munich. He wrote *Philosophische Hymnen aus der Rig- und Atharva-Veda-Sanhitâ* (1887), and *Materialien zur Geschichte der indischen Visionslitteratur* (1892), and in 1894 became the editor of the *Orientalische Bibliographie*.

SCHERR, shĕr, JOHANNES (1817-86). A German literary critic, born at Hohenrechberg, Swabia, and educated at the universities of Zurich and Tübingen. In the revolution of 1848 he took so prominent a part that he was forced to flee to Switzerland. After 1860 he taught in the Zurich Polytechnic. He wrote some purely humorous sketches, a few novels, of which the most popular was *Michel, Geschichte eines Deutschen unserer Zeit* (1858; 7th ed. 1895); a series of literary and cultural histories and essays, notably *Allgemeine Geschichte der Litteratur* (1851; 10th ed. 1900); *Deutsche Kultur- und Sittengeschichte* (1852; 11th ed. 1902); *Geschichte der englischen Litteratur* (1854; 3d ed. 1883); *Geschichte der deutschen Frauenwelt* (4th ed. 1879); and biographies of Schiller (1859; last ed. 1900) and of Blücher (1862; 4th ed. 1887). German critics compare him to Carlyle, because of his vivid style, his vehement bias, and his biting wit.

SCHERZER, shĕr'tsĕr, KARL VON (1821-1903). An Austrian traveler and author. He was born at Vienna and in 1852-55, with Moritz Wagner, visited the United States, Central America, and the West Indies. In 1857-59 he accompanied the Novara expedition around the world. On his return he was knighted, and in 1866 was made Ministerial counselor in the Department of Commerce. In 1869 he accompanied the Austrian expedition to Eastern Asia, and in 1872 entered the diplomatic service, becoming Consul-General in Smyrna. In 1875 he was transferred to London, in 1878 to Leipzig, and in 1884 to Genoa. He was an acute observer and wrote many volumes, among the more important being *Reisen in Nordamerika* (with Wagner, 1854), *Wanderungen durch die mittelamerikanischen Freistaaten* (1857), *Reise der österreichischen Fregatte Novara um die Erde* (1861-62, and statistical section, 1864), *Fachmännische Berichte über die österreichisch-ungarische Expedition nach Siam, China und Japan* (1872), *Smyrna* (1873), and *Das wirtschaftliche Leben der Völker* (1885).

SCHERZO, skĕr'tsô (It., jest, sport). In music, a term applied to an instrumental composition of a lively, piquant character, admitting sudden and violent contrasts of dynamic shading. The term was originally used as a direction-mark for performers. In the modern sonata or symphony, however, the scherzo is an essential movement. It was first introduced by Beethoven, who greatly extended the form and gave it its special character, in his Second Symphony, where it takes the place of the minuet in the symphonies of Haydn and Mozart. Even in Haydn's time the minuet in the symphony had lost its original stately character, and Beethoven's first scherzo is more like the minuet than the form which he perfected later in the *Eroica*. Schumann, in the first and second of his symphonies, becomes an innovator through the introduction of *two* trios, instead of the usual *one*.

SCHEURER-KESTNER, shoi'rĕr-kĕst'nĕr, *Fr. pron.* shē'râr' kĕst'nâr', AUGUSTE (1833—). A French chemist and politician. He was born at Mühlhausen, Alsace, and studied chemistry

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in Paris. Becoming interested in the efforts to improve the condition of the workingman, he founded for that purpose, in 1865, a co-operative society. He was elected a representative from the Upper Rhine in the National Assembly in 1871, and in 1875 he was elected to the Senate. In 1879 he succeeded Gambetta as director of the journal *La République Française.* During the Dreyfus excitement he was conspicuous among those who believed in the prisoner's innocence, and he testified at Zola's trial. In addition to several scientific monographs, he published *Principes élémentaires de la théorie chimique des types appliqués aux combinaisons organiques* (1862).

SCHEVENINGEN, skā'ven-ing'en. A noted bathing resort in South Holland, the Netherlands, on the coast, about two miles northwest of The Hague, with which it is incorporated and connected by a fine shaded allée, a canal, and an electric road (Map: Netherlands, Q 2). It has a fine Kurhaus and is visited annually by over 20,000 guests. Here, in 1653, the English gained a great naval victory over the Dutch under M. Tromp, who was killed, and here De Ruyter, in 1673, defeated the combined fleets of England and France. Population, in 1900, about 20,000.

SCHIAPARELLI, skē'ä-pä-rel'lē, GIOVANNI (1835—). An Italian astronomer, born at Savigliano, in Piedmont. He studied in Turin, in Berlin under Encke, and at Pulkova under W. Struve. In 1859 he returned to Italy and became second astronomer at the Milan observatory, and in 1862 its director, continuing in that position until 1900. In 1861 he discovered the planetoid Hesperia. In 1877 he discovered certain markings on the surface of Mars, the so-called 'canals.' (See MARS.) He has also announced that he has been able to observe markings on the surface of Mercury and to fix the period of its axial rotation as the same as that of its sidereal rotation. This, however, has not yet been sufficiently confirmed by other astronomers. (See MERCURY.) Of his numerous important writings may be mentioned *The Relation Between Comets and Falling Stars* (1871); *The Precursors of Copernicus in Antiquity* (1873); *Observations on the Movement of Rotation and the Topography of the Planet Mars* (1878-86).

SCHIAVONE, skē'ä-vō'nä, ANDREA (c.1522-82). The appellation of Andrea Meldolla (Medolla, or Medula), an Italian etcher and engraver. He was born at Sebenico (Dalmatia), and went early to Venice and worked as a house decorator. He thus came under the notice of Titian, whose studio he entered and by whom he was strongly influenced. Giorgione and Tintoretto also left their mark upon his style. Indifferent in design, he succeeded to a marked degree in acquiring the Venetian color. He was one of the first painters of landscape for its own sake. Among his paintings are a "Pietà" and a "Madonna with Two Saints" (Dresden); "The Adoration of the Shepherds" (Uffizi); "Jupiter and Io" (Saint Petersburg); ceiling and wall paintings in the Libreria and San Rocco, Venice, and elsewhere. His etchings and engravings are inferior.

SCHIEDAM, skē'dăm'. A river port of South Holland, the Netherlands, at the confluence of the Schie with the Meuse, three miles west of Rotterdam (Map: Netherlands, C 3). The town is noted for its numerous distilleries of Holland gin, which is exported together with grain. Population, 1900, 27,126.

SCHIEFNER, shēf'nĕr, FRANZ ANTON (1817-79). A Russian Orientalist, born in Reval (Esthonia), and educated at Saint Petersburg and Berlin. He was elected a member of the Saint Petersburg Academy of Sciences in 1852 and was chosen librarian of that body in 1863. Among his studies on the languages of Central Asia, the most important were on Tibetan literature, especially as a source for North Indian Buddhism. In 1868 he edited, and in 1869 translated into German, an edition of Taranatha's history of Buddhism. He also devoted himself to the Ural-Altaic and Sibiric languages, translated the Kalevala (1852), and wrote on the Tush (1856), Udic (1863), Tchetchents (1864), and Kasikumutch (1866) dialects.

SCHIEVELBEIN, shē'fel-bīn, HERMANN (1817-67). A German sculptor, born in Berlin, where he became the pupil of Wichman. After an apprenticeship of three years he went to Saint Petersburg, and executed much decorative work, besides some statuary, for the Winter Palace and Saint Isaac's Cathedral. In 1841 he won the great prize of the Academy of Berlin, and after a short sojourn in Rome, returned to execute the group of "Pallas Athene Instructing the Youth in the Use of Weapons," for the palace bridge. Numerous plastic works for the royal palaces and various public buildings bear witness to his activity in Berlin, but his masterpiece was the grand frieze, more than two hundred feet in length, depicting in a series of impressive scenes the "Destruction of Pompeii and Herculaneum," in the Greek court of the New Museum. The plaster model of this extensive and harmonious composition is in the National Gallery. Distinguished for richness of imagination, noble conception, and intense poetic feeling, Schievelbein faithfully adhered to the traditions of the school founded by Schadow and Rauch.

SCHILLER, shīl'lĕr, JOHANN CHRISTOPH FRIEDRICH VON (1759-1805). A famous German poet and dramatist, born at Marbach, Württemberg, November 10, 1759. Schiller's father was a military surgeon and captain; his mother an innkeeper's daughter with a taste for music. As a child he showed imagination, and desired to become a clergyman, but the autocratic Duke Karl of Württemberg "gently kidnapped" him for his military academy, aptly named "Solitude" (1773), against his will and his parents' desire. Here, under stern yet whimsical discipline, Schiller pined and read with omnivorous hunger, especially Shakespeare, Lessing, Klopstock, Goethe's *Werther*, and the sensational "Storm and Stress" (q.v.) dramas of Klinger and Leisewitz. Clandestinely he began to write, and when, in 1775, the school was moved to Stuttgart, he took up the study of medicine, but he continued his poetic essays, and in 1777 set to work on *Die Räuber*, the first of his published plays, intended as an emphatic protest against the existing political conditions of which he had himself been a victim.

On graduating from the ducal school (December 14, 1780), Schiller was forced to take service as regimental surgeon, galled alike by his functions and his dress. His rebellious mood was

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shown by a poem on the death of his friend Weckerlin, a bitter defiance of society and its conventional creed. *Die Räuber*, printed at his own expense (1781), made an immediate and deep impression. In a somewhat weakened form it was produced (January 13, 1782) with great applause, though its style was in part as rough and unpolished as its plot was unnatural. Schiller, who had gone surreptitiously to Mannheim to witness it, was sentenced to two weeks' arrest and forbidden to publish anything whatever. He escaped from Württemberg (September, 1782) with a romantic friend, Streicher, and for eight months remained in retirement with a generous patroness, Frau von Wolzogen, at Bauerbach. An historical drama, *Fiesco*, was nearly completed at the time of Schiller's escape. This he sold to the Mannheim theatre for ten louis, and began with fresh enthusiasm a third, *Luise Millerin*, later called *Kabale und Liebe*, on local political conditions, and a fourth on *Don Carlos*, son of Philip II. of Spain, in whose tragic fate Schiller's letters show that he had been for some years interested. He also made love to his patroness's daughter, which induced the mother to help him to establish himself at Mannheim (July, 1783), where he had an offer of permanent engagement as dramaturgist, which, however, he was soon compelled to cancel because of illness. *Fiesko* was produced in January, 1784, and failed. It was a disguised political manifesto, more radical and democratic than the Mannheim public would tolerate, and it lacked intrinsic value; but it is of interest as Schiller's introduction to historical drama, in which his greatest dramatic successes were later to be achieved. *Kabale und Liebe*, which was enthusiastically received at Mannheim in April, 1784, was political also, but it was genuinely national and became immediately popular, touching the grander passions of human nature, and being recognized as the best German drama of contemporary life.

Under the influence of Wieland (q.v.), Schiller now began to turn *Don Carlos* into blank verse. He left Mannheim (April, 1785), in debt, but famous, and passed nearly two years in Gohlis, near Leipzig, and in Dresden, in close association with Körner, father of the patriotic poet, and himself a Mæcenas, who lent Schiller money. Here Schiller's morbid spirit yielded to the excessive hopefulness voiced in his *Ode to Joy* (*An die Freude*), and in some declamatory passages of *Don Carlos*, which was not finished until May, 1787, for work on it had been interrupted by historical and philosophic studies, as well as by an unfinished attempt at prose romance, *Der Geisterseher*. A brief passion for Henriette von Arnim was not allowed to interrupt a platonic affection for the fascinating and emancipated Charlotte von Kalb, and this affection contributed not a little toward Schiller's choice of Weimar as his next place of abode (July, 1787).

The sensational success of *Don Carlos* was Schiller's sufficient passport to the German Athens, whose Duke had already given him a title. Its genuine, heartfelt, and pathetically preposterous enthusiasm for 'humanity' fell in with the spirit of the French Revolution and earned its author, in August, 1792, the honor of French citizenship. Schiller was warmly received in literary Weimar. Herder and Wieland were cordial; Goethe, however, was in Italy. Schiller now turned from the drama to history, and in 1788 won scholarly consideration by the first volume of a study of the revolt of the Netherlands from Spain (*Geschichte des Abfalls der Niederlande*). He composed also as much as he ever wrote of the *Geisterseher*, and published two short poems, *Die Künstler* and *Die Götter Griechenlands*, significant because they mark the beginning of the classical influence that was soon to change the whole character of his work. He also did critical work on Wieland's *Deutscher Merkur*, studied Euripides and Homer, and found new joy of life in the acquaintance of Charlotte von Lengenfeld (born November 22, 1766), whom he afterwards married. With this inspiration he set to work to write himself out of debt, in the course of which he exasperated Goethe by criticism of *Egmont*. But, though their relations for six years after their first meeting (September 7, 1788) were those of distant courtesy, Goethe procured Schiller an appointment as adjunct professor of history, without pay, at Jena, then the chief university centre of German culture. Here his first lectures were sensationally successful, but his financial embarrassments continued, till relieved by a salary of 200 thalers, procured through the friendly offices of Frau von Stein (q.v.). Soon afterwards he married (February, 1790). In the next year overwork brought on illness, from which Schiller never wholly recovered, but a magnanimous gift from Prince Frederick Christian of Holstein-Augustenburg, of 1000 thalers annually for three years, relieved him from pressing burdens. He completed a history of the Thirty Years' War (1793), and drew from the *Æsthetics* of Kant inspiration for essays on that subject in the literary journals *Thalia* and *Die Horen*, that contributed essentially to the development of taste and criticism in Germany. The most remarkable of these, *On the Naïve and Sentimental in Poetry* (1796), was written after Schiller had formed with Goethe the friendship that was to guide and inspire Schiller's later years.

This period of prose composition had been interrupted in 1793 by illness. Schiller gave up his lectures at Jena and spent a year wandering in search of health. He had now become mentally ripe for intellectual communion with Goethe. Their meeting, by a prearranged chance, was a mutual surprise. Their acquaintance grew almost immediately to a friendship of rounded completeness. Their correspondence extends to more than 1000 letters and is a monument to literary unselfishness. They were constantly together, and talked unreservedly of their work and plans. Together they edited *Die Horen*, and soon, through his *Wilhelm Meister*, Goethe won Schiller back to poetry. *Die Ideale*, *Das Ideal und das Leben*, *Der Spaziergang* (1795), are witnesses to this new spirit and mark the highest reach of Schiller's philosophic muse. Their common part in the literary controversy of the day is marked also by the 400 *Xenien*, "parting gifts" of epigram in the *Musenalmanach* (1796).

And now Schiller was ready for the loftiest flights of his dramatic genius. For ten years this talent had lain fallow, but they were years of æsthetic ripening. The realistic spirit of Goethe inspiring a great idealist was now to pro-

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SCHILLER
FROM A PORTRAIT BY ANTON GRAFF

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duce the classic Schiller. But first came the great ballad year (1797). While arranging materials for *Wallenstein*, on which composition was not begun till November, Schiller wrote *Der Taucher*, *Die Kraniche des Ibykus*, *Der Handschuh*, *Der Ring des Polykrates*, *Ritter Toggenburg*, and *Der Gang nach dem Eisenhammer*, all familiar to every German schoolboy, and remarkable for depth and intensity. In 1797 Schiller began also that most prized of German lyrics, *Das Lied von der Glocke* (1799), and in 1798 added to the list *Die Bürgschaft* and *Der Kampf mit dem Drachen*. In November, 1797, led by Goethe's counsel, he began to cast somewhat in its present form *Wallensteins Lager*, the introduction to the *Piccolomini*, and *Wallensteins Tod*, and by New Year he told Goethe that he had surpassed his best former self as "the fruit of our intercourse." It was not, however, till September, 1798, that he saw his way clear to the present trilogy, again during a visit to Goethe, and *Wallensteins Lager*, with the *Prolog*, was acted at Weimar, October 12, 1798, with great enthusiasm. *Die Piccolomini*, the trilogy's second part, was forwarded also by Goethe at every turn, and so effectively that it was finished by Christmas and acted on January 30, 1799, to a public which seemed awed by a loftier spirit than had yet crossed the German stage. Again Schiller visited Goethe for three weeks in Weimar, and before the end of March *Wallensteins Tod* was completed. The drama was presented in its complete form April 15, 17, and 20, 1799, ever memorable days in the annals of Weimar and of the German stage. As an acting play *Wallenstein* has never been surpassed in Germany. It revealed a new Schiller to the world and to himself. *Wallenstein* was a drama of the Thirty Years' War, of the inevitable conflict between the old order and the new, between genius and duty, between love and loyalty. Schiller left Weimar resolved to put on the stage the tragedy of Mary of Scotland. *Maria Stuart* was elaborated during a visit to Goethe, in May, 1799, and acted in June, 1800. His work suffered constant interruption from ill health, but he had never shown such mastery of the technique of his craft as in *Maria Stuart*. The versification is smoother than in *Wallenstein*, the arrangement more artistic, the story more dramatically unfolded, but the conception is inferior and the chief characters lack tragic depth. It is the pathos of Mary's fate more than its tragic necessity that impresses the spectator. Schiller now occasionally replaced Goethe in the management of the Weimar Court Theatre, and thus found occasion to adapt Shakespeare's *Macbeth* to its needs. Traces of this work are obvious in his next 'romantic tragedy,' *Die Jungfrau von Orleans*, an idealization of Joan of Arc, first acted in Leipzig, September 18, 1801. It was an unparalleled popular triumph, for it accorded with the romantic taste. It is now less admired.

In the autumn of 1801 Schiller visited Dresden and was so attracted to ideals of classic art, by what he saw in its museums, that his next drama, *Die Braut von Messina*, was severely classical in structure and conception. It was not completed until 1803. Herein relentless Nemesis appears in awful simplicity. In stateliness and dignity of diction, in classic irony, the drama is supreme in Germany, but it did not win popular applause.

Before *Die Braut von Messina* had been acted, *Wilhelm Tell*, Schiller's last drama, was already well advanced, and two plays had been adapted from the French of Picard (*Encore des Ménechmes* as *Der Neffe als Onkel* and *Médiocre et Rampant* as *Der Parasit*). Meantime Schiller had been ennobled. He was glad of it "for Lolo's and the children's sake." Work on the final form of *Tell* was begun in August, 1803, and the play was finished in February, 1804, after much study for effects of 'local color' and interruptions from the insatiable, inquisitive Madame de Staël, whose society, he told Goethe, was 'suffocating.' Her departure from Weimar made him feel "as though he had recovered from a severe illness."

Tell is sharply differentiated from all that goes before. Here success crowns a sane activity, fate yields to will, the visionary reformer of *Die Räuber* and *Don Carlos* has become a practical realist. This growing serenity well befits the poet's last work and crowning achievement. The story of the Swiss hero struck a patriotic chord, for Germany was then on the eve of her deepest humiliation. No German drama had before nor has since produced so deep or enduring an impression. Schiller was invited to Berlin and royally welcomed. Prostrated by illness on his return, he did little during some months of suffering but sketch out *Demetrius*, a drama taken from Russian history, showing that his power of tragic conception and dramatic execution was at its highest at his untimely death in Weimar, May 9, 1805.

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Wallenstein. Documents and other memorials of Schiller are in the Schiller Archiv, united in 1889 with the Goethe Archiv in Weimar. The *Schiller-Stiftung* is a fund raised to commemorate the centenary of the poet's birth, its income being devoted to the aid of needy men of letters.

SCHIL'LING, JOHANNES (1828—). A German sculptor, born at Mittweida, Saxony. He studied chiefly under Rietschel at Dresden, and Drake at Berlin. After winning a prize at Dresden, which enabled him to study for three years at Rome, he returned to that city in 1856, and became professor in the Academy in 1868. His first works to attract attention were the four admirable groups of "Morning," "Noon," "Evening," and "Night," on the Brühl Terrace in Dresden; of importance are also the monument to Schiller at Vienna; the colossal group of "Dionysos and Ariadne" in a chariot drawn by panthers, on the façade of the Royal Theatre at Dresden; and the monument to Emperor William I. at Wiesbaden (1894). His masterpiece is the celebrated national monument in the Niederwald (unveiled in 1883), in which the colossal figure of Germania is especially remarkable. His works represent the transition from the classical to the romantic style, and are characterized by a high sense of the beautiful and by careful execution. Consult Pecht, *Deutsche Künstler*, iv. (Nördlingen, 1885).

SCHIM'PER, KARL (1803-67). A German botanist, the pioneer of modern botanical morphology. He was born in Mannheim and was educated for the Church, but in 1826 began the study of botany at Munich. There he was docent for many years, spending much of his time in geological expeditions in the Alps and Pyrenees. In 1849 he received a pension from the Grand Duke of Baden and removed to Schwetzingen. Schimper's *Beschreibung des Symphytum Zeyheri* (1835) expressed the theory of phyllotaxis, which he had formulated several years before, and which is his chief claim to fame. Consult Volger, *Leben und Leistungen des Naturforschers Karl Schimper* (Frankfort, 1889).

SCHIMPER, WILHELM PHILIPP (1808-80). A German geologist and botanist, best known for his valuable studies of the mosses. He was born in Strassburg, studied there, and in 1835 became assistant in the University Museum of Natural History, of which he was made director in 1839. He taught mineralogy and botany in the University of Strassburg and wrote *Bryologia Europæa* (with Bruch and Gümbel, 1836-55; supplement, 1864-66), *Icones Morphologicæ* (1860), *Palæontologica Alsatica* (1854), and *Traité de paléontologie végétale* (1869-74). Consult Grade, *Guillaume Philippe Schimper* (Colmar, 1882).

SCHINKEL, shĭŋk'el, KARL FRIEDRICH (1781-1841). An eminent German architect. He was born at Neuruppin, Brandenburg, March 13, 1781, and studied the principles of drawing and design at Berlin under David and Friedrich Gilly. In 1803 he went to Italy to extend his professional knowledge; but on his return in 1805 he found the aspect of public affairs so threatening that he could obtain little employment, and was forced to take up landscape painting. In May, 1811, he was elected a member of, and in 1820 became professor at, the Berlin Academy of Fine Arts. Other offices and honors were also conferred on him. He died at Berlin October 9, 1841. His principal structure was the Old Museum (1825-30), an admirable edifice in Greek style; other designs to which he chiefly owes his reputation are those of the Royal Guard-house (1816-18), the Royal Theatre (1819-21), the memorial of the War of the Liberation (1821), the palace bridge (1822-24), the new Potsdam gate, the artillery and engineers' school, in Berlin; the casino and the Church of Saint Nicholas in Potsdam; and a great number of castles, country houses, churches, and public buildings. Schinkel was a man of powerful and original genius; his designs are remarkable for the unity of idea by which they are pervaded, and the vigor, beauty, and harmony of their details. His tendencies were classical and he succeeded admirably in adapting Grecian forms to the need of modern buildings. Consult: *Aus Schinkels Nachlass*, edited by Wolzogen (Berlin, 1862-64); and the biographies by Kugler (ib., 1842), Bötticher (ib., 1857), Quast (Neuruppin, 1866), Herman Grimm, Woltmann, Dohme (Leipzig, 1882), Pecht (Nördlingen, 1885), and Ziller (ib., 1897).

SCHIO, skē'ō. A town in the Province of Vicenza, Italy, 20 miles by rail northwest of Vicenza (Map: Italy, F 2). It has an eighteenth-century cathedral and noted wool factories. There are also marble quarries, and silk, clay, and dye works. Population (commune), in 1901, 13,494.

SCHIPPER, shĭp'ĕr, JAKOB (1842—). A German philologist and English scholar, born in Oldenburg. He studied modern languages in Bonn, Paris, Rome, and Oxford, collaborated on the revision of Bosworth's Anglo-Saxon Dictionary, and was professor of English philology at Königsberg from 1872 until 1877, when he received a like chair in Vienna. There he was elected to the Academy of Sciences in 1887, and acted as editor of the *Wiener Beiträge zur englischen Philologie* (1895-1900). He published *Englische Metrik* (1881-88), an important work, supplemented by a *Grundriss der englischen Metrik* (1895); *Zur Kritik der Shakespeare-Bacon-Frage* (1889), and *Der Bacon-Bacillus* (1896), and editions of the Alexis legends (1877-87), of Dunbar's poems (1892-94), and of Alfred's version of Bede's ecclesiastical history (1897-99).

SCHIRMER, shēr'mĕr, JOHANN WILHELM (1807-63). A German landscape painter and etcher, born at Jülich. He studied under Schadow at Düsseldorf, and in 1853 was appointed director of the art school at Karlsruhe. He became known as one of the first of the so-called Düsseldorf landscape school. His romantic, classic, and biblical subjects include "The Grotto of Egeria" (1842), in the Leipzig Museum; "Twelve Scenes from the History of Abraham" (1859-62), and "An Italian Park," in the National Gallery at Berlin; four scenes of the "Good Samaritan" (1857), and "Storm in the Campagna," at Karlsruhe, and pictures in many other galleries in European cities.

SCHISM, WESTERN or GREAT. A celebrated disruption of communion in the Catholic Church, which arose out of a disputed claim to the succession to the Papal throne. On the death of Gregory XI., in 1378, a Neapolitan, Bartolommeo Prignano, was chosen Pope by the majority of the cardinals in a conclave at Rome, under the name of Urban VI. Soon afterwards, however, a

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number of these cardinals withdrew, revoked the election, which they declared not to have been free, owing to the violence of the factions in Rome by which the conclave had, according to them, been overawed; and, in consequence, they proceeded to choose another pope under the name of Clement VII. The latter fixed his seat at Avignon, while Urban VI. lived at Rome. Each party had its adherents, and in each a rival succession was maintained down to the Council of Pisa in 1409, in which assembly both popes, the Roman Pope Gregory XII. and the Avignon Pope Benedict XIII. (Pedro de Luna), were deposed, and a third, Alexander V., was elected. He died a few months later, and was succeeded by John XXIII. A new council was convoked at Constance in 1414, by which not alone the former rivals, but even the new pontiff elected, by consent of the two parties, at Pisa, were set aside, and Otto Colonna was elected under the name of Martin V. In this election (1417) the whole body may be said to have acquiesced; but one of the claimants, Benedict XIII., remained obstinate in the assertion of his right till his death in 1424. The schism, however, may be said to have terminated in 1417, having thus endured nearly forty years. Consult, especially, Gayet, *Le grand schisme d'occident, d'après les documents contemporains* (Paris, 1899 et seq.), and the authorities referred to under PAPACY.

SCHIST. See CRYSTALLINE SCHIST.

SCHISTOSITY, or FOLIATION. A structure exhibited by many metamorphosed rocks, which is characterized by a parallel arrangement of the minerals and a tendency to split or cleave into plates. It is produced by a recrystallization of the constituents of a rock under the influence of metamorphic processes, such as heat and great pressure. Among the crystalline schists this structure is very prominent, such types as chlorite schist, talc schist, and actinolite schist cleaving almost as readily as slate.

SCHIZOGAMY, skĭ-zŏg'a-mĭ (from Gk. σχίζειν, *schizein*, to split + γάμος, *gamos*, marriage). That method of reproduction in which a sexual worm is produced (1) by fission or self-division, when it is said to be 'fissiparous,' or (2) by budding or gemmation, from a sexless worm, such as occurs in Syllis, etc., when it is said to be 'gemmiparous.' Thus schizogamy is a form of parthenogenesis (q.v.).

SCHIZOGONY, skĭ-zŏg'o-nĭ (from Gk. σχίζειν, *schizein*, to split + -γονία, *-gonia*, generation, from γόνος, *gonos*, seed). A kind of asexual generation, or self-fission, observed in many ophiuroids (q.v.) or brittle-stars, especially in the young, and also in starfishes, as species of Asterias, etc. In such cases the animal voluntarily divides through the disk in the shortest direction, i.e. from the mouth (oral) side to the upper (aboral) side, each separate half regenerating the missing parts as well as the additional arms. The division is brought about in most cases, and perhaps all, says Morgan, by the contraction of the muscles, and their arrangement in connection with the form of the body is the real cause of the act. Compare REGENERATION.

SCHIZOMYCETES, skĭz'ō-mĭ-sē'tēz (Neo-Lat. nom. pl., from Gk. σχίζειν, *schizein*, to split + μύκης, *mykes*, mushroom), BACTERIA, FISSION FUNGI. One of the six great groups of fungi, closely related to the blue-green algæ (*Cyanophyceæ*, q.v.). They are minute one-celled plants, the smallest known organisms. They reproduce by fission (q.v.), and also pass into a resting condition (the so-called spore), in which, by secreting a protective wall, some can withstand a temperature above the boiling point of water. Some bacteria develop slime by the swell-

VARIOUS FORMS OF BACTERIA.

ing of the outer portions of the cell wall, so that the cells lie in a mass of mucilage. Many are free-swimming ciliated organisms, darting and twisting rapidly through the water. Although most species are unicellular, several of the higher groups are filamentous, in this resembling the higher blue-green algæ. Many are held to be responsible for certain diseases of man, animals, and plants, among which are diphtheria, bubonic plague, and pear blight; others (zymogenic bacteria) to produce chemical changes associated with decomposition and some forms of fermentation (qq.v.); others (chromogenic and photogenic) produce conspicuous pigments or emit light.

SCHIZOP'ODA. See CRUSTACEA; OPOSSUM-SHRIMP.

SCHLAGINTWEIT, shlä'gĭnt-vīt. The name of three explorers, sons of the Bavarian oculist Joseph Schlagintweit (1792-1854). HERMANN VON SCHLAGINTWEIT (1826-82), ADOLF (1829-57), and ROBERT (1833-85), traveled widely in Europe and Asia, and in 1859 were raised to the nobility by the King of Bavaria. They first attracted attention by their writings on the geography of the Alps, entitled *Untersuchungen über die physikalische Geographie der Alpen* (1850) and *Neue Untersuchungen* (1854), which included an atlas and a dissertation on the physical geography of the Kaisergebirge. In 1851 Hermann became privat-docent in meteorology and physics at the University of Berlin, and two years later Adolf began to lecture on geology at Munich. In the spring of the latter year the three brothers received commissions from the King of Prussia and from the British East India Company to study the meteorology and geology of the Himalaya Mountains. They reached Bombay in October, 1854, and proceeded thence by different routes over the Deccan to Madras. During the next spring and summer Adolf and Robert explored the Northwest Provinces, traversed the passes of the main chain of the Himalayas, and, after passing the Ibi Gamin (which they ascended to the height of 6788 meters, the

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greatest altitude then attained by scientists), entered Tibet. In 1856 they went to Simla, where they were joined by Hermann, who had been in Sikkim and Assam. From Simla they again crossed the Western Himalayas into Tibet; and then, while Hermann and Robert went to Leh in Ladakh and crossed the Karakorum and the Kuen-lun, Adolf explored Western Tibet and the country about the Upper Indus. Later in the year Robert crossed the country drained by the Indus. Afterwards Hermann and Robert settled in Berlin, where they opened a museum and spent much of the remainder of their lives studying and classifying their collections. Adolf went once more to Leh and again crossed the Karakorum and the Kuen-lun. In August, 1857, while traveling in Chinese Turkestan, he was arrested, taken to Kashgar, the capital, and there beheaded. Hermann and Robert published a report of their explorations under the title, *Results of a Scientific Mission to India and High Asia* (with atlas, 1860-66), the substance of which Hermann subsequently translated into German as *Reisen in Indien und Hochasien* (1869-80). Robert later traveled extensively in the United States and recorded his impressions in several works, including: *Kalifornien* (1871); *Die Mormonen* (2d ed. 1873); and *Die Prärien* (1876). Another brother, EMIL (1835-1904), is known for his studies of the language and history of Tibet.

SCHLAN, shlän. A town of Bohemia, Austria, 44 miles by rail northwest of Prague (Map: Austria, D 1). It has a Franciscan monastery, agricultural, art, and industrial schools, and several hospitals. There are extensive coal fields and important manufactures of iron, machinery, chemicals, and cotton. Population, in 1900, 9494.

SCHLANGENBAD, shläng'en-bäd. A well-known watering place 5 miles northwest of Wiesbaden, Germany. It is delightfully situated in a forested vale, and is mostly frequented by women. The waters are alkaline. The old Kurhaus dates from 1694. Population, in 1900, 374.

SCHLATTER, shlät'ĕr, ADOLF (1852—). A German theologian, born in St. Gallen, Switzerland. He became professor in Bern in 1888, in Berlin, in 1893, and in Tübingen in 1897. He wrote *Der Glaube im Neuen Testament* (1885; 2d ed. 1896); commentaries on Romans (3d ed. 1895), on Hebrews (3d ed. 1898), on James and the Johannine Epistles (2d ed. 1900), on Matthew (2d ed. 1900); on John (1899), and on Mark and Luke (1900); *Zur Topographie und Geschichte Palästinas* (1893); and *Israels Geschichte von Alexander dem Grossen bis Hadrian* (1901). With Cremer he edited *Beiträge zur Förderung Christlicher Theologie* (1897 et seq.).

SCHLATTER, FRANCIS (1856—?). A cobbler who, because of miraculous cures attributed to him, became known as 'The Healer.' He was born of German peasants in the village of Elser, in Alsace-Lorraine. In 1884 he emigrated to the United States, where he worked at his trade in various cities until 1892, when he thought that a voice bade him sell his business, give the money to the poor, and devote his life to healing the sick. He was then in Denver, Col., but soon after entering upon his mission left that city, and, traveling on foot, visited Kansas City, Hot Springs, Arkansas, El Paso, San Diego, San Francisco, and Albuquerque. At the latter place in July, 1895, he suddenly became famous. Crowds gathered about him daily, hoping to be cured of their diseases by simply clasping his hands. The following month he returned to Denver, but did not resume his healings until September. Meantime, a great multitude had gathered there to receive treatment from him. Schlatter is said to have refused all reward for his services, and when money was given to him in such a way that it could not be returned it was asserted that he distributed it among the poor. His manner of living was of the simplest, and he taught no new doctrine. He said only that he obeyed a power which he called 'Father' and from this power he claimed to receive his healing virtue. On November 13 he disappeared, leaving behind him a brief note, in which he declared that his mission was ended.

SCHLATTER, MICHAEL (1716-90). A German Reformed minister. He was born at Saint Gall, and was educated there and at the University of Helmstedt. He entered the ministry, and in 1746 was sent by the synods of Holland to the German Reformed emigrants in Pennsylvania. He was pastor of the German Reformed churches in Philadelphia and Germantown, 1746-51, and organized churches in Pennsylvania, New Jersey, Maryland, and Virginia. He assisted in organizing the Synod of the German Reformed Church in 1747, but in 1755 gave up pastoral work, so as to devote himself to the organization of schools among the Germans, in which English should be taught. In 1757 he was chaplain of an expedition to Nova Scotia against the French, returned in 1759, and preached at Chestnut Hill, now part of Philadelphia, and elsewhere. He was still a royal chaplain when the Revolutionary War broke out, but, espousing the cause of the colonies, he was imprisoned in 1777, when the British took Philadelphia. Consult his *Life* by H. Harbaugh (Philadelphia, 1857).

SCHLECHTA, shlĕk'tä, OTTOKAR MARIA VON (1825-94). An Austrian Orientalist. He was born in Vienna, studied there, was dragoman in Constantinople from 1848 to 1860, and from 1870 to 1874 was Consul-General at Bucharest, where he represented the Danube Commission, and whence he was transferred to Teheran to act as Plenipotentiary there. The Schlechta collection of Oriental manuscripts is now in the Vienna Imperial Library. He wrote *Die osmanischen Geschichtschreiber der neuern Zeit* (1856), *Der Kampf zwischen Persien und Russland in Transkaukasien* (1864), *Manuel terminologique français-ottoman* (1870), and valuable translations from the Persian.

SCHLEGEL, shlä'gel, AUGUST WILHELM VON (1767-1845). A distinguished German critic, poet, and Orientalist. He was born at Hanover, September 8, 1767, and studied at Göttingen. He first began to win prominence in literature, while a lecturer at Jena, by his contributions to Schiller's *Horen* and *Musenalmanach*, and to the *Allgemeine Litteraturzeitung*. About the same time his translation of Shakespeare began to appear (1797-1810), the influence of which on German poetry and on the German stage was alike great. The poet Tieck undertook a revision of the work, together with a translation of such plays as Schlegel had omitted (1825, 1839, 1843).

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The Schlegel-Tieck translation is universally considered better than any other rendering of Shakespeare in a foreign language. Thanks to Schlegel and Tieck, Shakespeare has become a national poet of Germany. Schlegel also delivered at Jena a series of lectures on æsthetics, and, with his brother Friedrich (q.v.), edited the *Athenäum* (1798-1800), a severely critical authority of high rank. He published, besides his first volume of poems, *Gedichte* (1800), and, in company with his brother, the *Charakteristiken und Kritiken* (1801). In 1801 Schlegel left Jena for Berlin, where he gave a series of lectures on literature, art, and the spirit of the time. In 1803 appeared his *Ion*, an antique tragedy of considerable merit. It was followed by his *Spanisches Theater* (1803-09), consisting of five pieces of Calderon's, admirably translated, the effect of which has been to make that poet a favorite with the German people, and his *Blumensträusse der italienischen, spanischen und portugiesischen Poesie* (Berlin, 1804), a charming collection of southern lyrics, from the appearance of which dates the naturalization in German verse of the metrical forms of the Romanic races. In 1804, having become estranged from his wife, a daughter of Professor Michaelis of Göttingen, Schlegel entered the household of Madame de Staël as a tutor of her children. He traveled much, visiting Italy, France, Austria, and Sweden. He wrote in French a *Comparaison de la Phèdre d'Euripide avec celle de Racine* (1807). Probably his most valuable, and certainly his most widely popular work, was the *Vorlesungen über dramatische Kunst und Litteratur* (1809-11), originally delivered at Vienna, in the spring of 1808, and translated into most European languages.

Between 1811 and 1815 Schlegel published a new collection of his poems (*Poetische Werke*), which contains his masterpieces, "Arion," "Pygmalion," "Sankt Lucas," and is notable for the richness and variety of its poetic forms. In 1818 Schlegel, now raised to the nobility, was appointed professor of history in the University of Bonn, and devoted himself especially to the history of the fine arts and to philological research. He was one of the first students of Sanskrit in Germany, and published at Bonn an *Indische Bibliothek* (1820-26). About 1817 Schlegel married a daughter of Professor Paulus of Heidelberg, but they parted in 1821. Schlegel was quarrelsome, jealous, and ungenerous in his relations with literary men, and did not even shrink from slander when his spleen was excited. He died in Bonn, May 12, 1845. Consult: Pichtos, *Die Aesthetik A. W. von Schlegels in ihrer geschichtlichen Entwicklung* (Berlin, 1894); and Bernays, *Zur Entstehungsgeschichte des Schlegelschen Shakspeare* (Leipzig, 1872).

SCHLEGEL, Friedrich von (1772-1829). A German literary historian, critic, and writer on æsthetics, brother of August Wilhelm von Schlegel, born at Hanover. He studied philosophy at Göttingen and Leipzig, and in 1797 published his first work, *Die Griechen und Römer*, which was followed in 1798 by his *Geschichte der Poesie der Griechen und Römer*. The chief vehicle at this time for the dissemination of his philosophical views of literature was the *Athenäum*, an organ of the romantic school, edited by himself and his brother. In *Lucinde*, an unfinished novel (1799), he cynically reveals his relations with Dorothea Veit, who had left her husband, a Berlin banker, in 1798 and ultimately married Schlegel in Paris (1804). Proceeding to Jena, he began there as a privat-docent, delivering lectures on philosophy, which met with small favor, and still editing the *Athenäum*, to which he also began to contribute poems of his own. In 1802 appeared his *Alarcos*, a tragedy, in which the classical and romantic elements are queerly blended. From Jena he soon went to Paris, where he gave philosophical lectures, edited the *Europa*, a monthly journal (1803), and applied himself to the languages of Southern Europe, and to Sanskrit, the fruits of which were seen in his treatise *Ueber die Sprache und Weisheit der Indier* (1808). During his residence in Paris he also published a *Sammlung romantischer Dichtungen des Mittelalters* (1804).

He returned to Germany in 1804 and settled at Cologne. There, in 1808, he and his wife joined the Roman Catholic Church, a change which powerfully affected his future literary career. In the same year Schlegel went to Vienna, where he was employed by the Archduke Charles as a secretary, and wrote fervent proclamations against Napoleon. In 1811 appeared the lectures he had delivered at Vienna, under the title, *Ueber die neuere Geschichte*, and in 1815 his *Geschichte der alten und neuen Litteratur*. In 1819 he made a trip to Italy. In 1822 a collected edition of his writings, in 12 volumes, was published by himself. Subsequently he delivered at Vienna and Dresden lectures on the "Philosophy of Life" (*Philosophie des Lebens*, 1828), on the "Philosophy of History" (*Philosophie der Geschichte*, 1829), and on the "Philosophy of Language" (*Philosophie der Sprache*, 1830). He died in Dresden. His manuscripts were published by Windischmann (Bonn, 1836-37). Consult *Friedrich Schlegel, Briefe an seinen Bruder*, edited by Walzel (Berlin, 1890).

SCHLEICH, shlīk, Eduard (1812-74). A German painter, born at Harbach, near Landshut, Bavaria. In all his pictures the play of sunlight, the clouds, the haze over the sun, and sky effects are particularly fine. His landscapes are to be found in all the principal galleries of Germany. Consult Pecht, *Deutsche Künstler*, iv. (Nördlingen, 1885).

SCHLEICHER, shlīk'ĕr, August (1821-68). A German philologist, born at Meiningen. He was educated at Leipzig, Tübingen, and Bonn. In 1850 he was appointed professor extraordinary of classical philology at Prague, becoming full professor of German, comparative philology, and Sanskrit three years later. Here he began the study of Lithuanian and the Slavic languages. In 1857 he was called to Jena as professor of the science of language and Germanic philology, and remained there until his death. Schleicher's importance in the history of comparative philology is due to the fact that he sums up in his *Kompendium der vergleichenden Grammatik der indogermanischen Sprachen* (1862; 4th ed. 1876) the results achieved by the science up to that date. His *Handbuch der litauischen Sprache* (1856-57) and his *Litauische Märchen, Sprichworte, Rätsel und Lieder* (1857) are still of value, while his *Deutsche Sprache* (1860; 5th ed. 1888) is a book of more popular interest. Among his other works the most important are:

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Zur vergleichenden Sprachgeschichte (1848); *Die Sprachen Europas* (1850); *Die Darwinsche Theorie und die Sprachwissenschaft*, in which he enunciated the so-called *Stammbaumtheorie* of the origin of dialects (see PHILOLOGY) (1863; 3d ed. 1873); *Ueber die Bedeutung der Sprache für die Naturgeschichte des Menschen* (1865); *Formenlehre der kirchenslawischen Sprache* (1853); an edition of the Lithuanian poems of Christian Donaleitis (1865); and the posthumous *Laut- und Formenlehre der polabischen Sprache* (1871). Consult Lefmann, *August Schleicher* (Leipzig, 1870).

SCHLEIDEN, shlī'den, MATTHIAS JAKOB (1804-81). A German botanist, born at Hamburg. After beginning a course of law at Heidelberg, he turned his attention to natural history and studied for several years at the universities of Göttingen and Berlin. In 1839 he became a professor of botany at Jena. There he remained until 1863, and after a brief residence at Dresden became in 1864 professor of botanical chemistry and anthropology at the University of Dorpat. This position he held for little more than a year, when he settled again in Dresden and devoted himself to private research and authorship. His most important work was his *Grundzüge der Wissenschaftlichen Botanik* (2 vols., 1842, 4th ed. 1862), in which he emphasized the inductive method of botanical research, and sharply attacked the hazy philosophical treatment of morphological questions. Among his other works were: *Beiträge zur Botanik* (1844); *Studien, populäre Vorträge* (1857); *Die Landenge von Sues* (1858); *Zur Theorie des Erkennens durch den Gesichtsinn* (1861); *Die Pflanze und ihr Leben* (1864); *Für Baum und Wald* (1870); *Die Rose* (1873); *Das Salz* (1875); *Die Romantik des Martyriums bei den Juden im Mittelalter* (1878); *Das Meer* (1887).

SCHLEIERMACHER, shlī'er-mäk'ĕr, FRIEDRICH ERNST DANIEL (1768-1834). A German theologian and philosopher, born in Breslau. Strong religious influences were brought to bear upon the boy, not only at home, but also at the Moravian schools in Niesky and Barby, where he spent four years (1783-87). He spent two years (1787-89) at the University of Halle, after which he became private tutor. In 1794 he was ordained to the ministry and became assistant to a clergyman at Landsberg. In 1796 he was appointed chaplain at the Charité Hospital in Berlin, where he continued for six years. He was on terms of intimate friendship with the Romanticists, especially Schlegel, and he sympathized with many of their tastes and aims, yet with a profound conviction of the necessity of religion, which they did not share. His first important literary work, *Ueber die Religion*, five discourses upon religion (1799), was designed to vindicate the claims of religion to the attention and respect of the cultivated. In the discourses one can trace a pantheistic tendency, derived from Spinoza, a philosopher whom Schleiermacher greatly admired. The *Monologe* were published in 1800, and exhibit the influence of Fichte's subjective idealism. The first collection of Schleiermacher's sermons appeared in 1801, followed later by several other collections, all of which had a wide circulation. From 1802 to 1804 Schleiermacher was Court preacher at Stolpe, in Pomerania, where he published his *Grundlinien einer Kritik der bisherigen Sittenlehre*. For the next two years he was professor extraordinary and university preacher at Halle, where he began the publication of his translation of Plato, a work which gave him an assured position among classical scholars. Here also he wrote a critical essay on *First Timothy*, rejecting the Pauline authorship, chiefly on the basis of internal evidence. In 1809 he took up his permanent residence in Berlin, where he became pastor of the *Dreifaltigkeitskirche* and professor at the newly founded university. As a member of the Academy of Sciences, he was brought into association with De Wette, Niebuhr, and many other eminent men. His influence over the Protestant Church for a quarter of a century was most marked, and he may almost be said to have dominated contemporary German theology. At the third centennial anniversary of the Protestant Reformation (1817), Schleiermacher took an active part in promoting the union of Lutheran and Reformed churches, a step toward ecclesiastical comprehension which accorded well with his convictions of what the Christian Church should be. His *Kurze Darstellung des theologischen Studiums* (1811) was an important contribution to that subject, and proved of great value in rightly directing the development of theological education in Germany. Probably the most important of all Schleiermacher's writings was his treatise on Christian faith, commonly cited under the name *Glaubenslehre* (1821; 3d ed. 1835), one of the truly great theological systems of history. For insight, grasp, and power of presentation, it has properly been compared with the works of Origen and Calvin, but in its general point of view it resembles the former far more than the latter. The *Grundriss der philosophischen Ethik* was published posthumously by his pupil Twesten (1841).

The works and teaching of Schleiermacher mark an epoch in the history of Christian thought. He restored religion to its place as a normal and necessary element of human nature, by pointing out a neglected factor, feeling. Rationalistic morals had for a long time usurped the place which religion ought to occupy, but had left men dissatisfied. Schleiermacher recalled them to their rightful spiritual privileges. Indeed, in his analysis of religion, he over-emphasized the truth he had rediscovered, making religion consist essentially in a 'feeling of absolute dependence.' The subjective character of his theology laid him open to severe criticism from the orthodox side, yet so genuine was his religious faith, and so central was the place of Christ in his teaching, that he escaped ecclesiastical censure. His influence has been strongly felt in Great Britain and America. Schleiermacher's *Sämmtliche Werke*, in 30 vols., appeared at Berlin in 1835-64. *Selected Sermons*, translated by M. F. Wilson, was published in London, 1890; *Speeches* (*Reden*), translated by John Oman, in London, 1893. Consult: *The Life of Schleiermacher*, translated by Rowan (London, 1860); Dorner, *History of Protestant Theology* (Eng. trans., Edinburgh, 1871); Lichtenberger, *History of German Theology in the Nineteenth Century* (Eng. trans., ib., 1889); Frank, *Geschichte und Kritik der neueren Theologie* (2d ed., Erlangen, 1895); Pfleiderer, *Protestant Theology*

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in Germany Since Kant (Eng. trans., London, 1890).

SCHLEIZ, shlīts. The second residence town of the Principality of Reuss, Younger Line, Germany, in a fertile district, 20 miles northwest of Plauen (Map Germany, D 3). Among the architectural features of the town are a late Gothic church with the burial vaults of the rulers, and the palace of the Prince with a library. Schleiz has a provincial deaf and dumb asylum, industrial art schools, and a workhouse. It manufactures cotton and woolen goods, metal wares, and toys. In the vicinity is a picturesque castle belonging to the Prince. Population, in 1900, 5331.

SCHLESWIG, shlās'vik (Danish *Slesvig*). Until 1864 a duchy belonging to Denmark, separated from Holstein by the Eider (Map: Denmark, C 4). In 1866 it was annexed to Prussia as a part of the Province of Schleswig-Holstein (q.v.).

SCHLESWIG. The capital of the Province of Schleswig-Holstein, Prussia, at the west end of the Schlei, 87 miles by rail north by west of Hamburg (Map: Prussia, C 1). It consists chiefly of a single semicircular street, and is divided into Friedrichsberg, Lollfuss, and the Altstadt. Its principal structures are the twelfth-century Romanesque Gothic Cathedral, restored in 1894, containing an oak shrine with 398 carved figures; Saint Michael's Church (1100), recently rebuilt; and the church and palace of Gottorp. The industries are fishing, the manufacture of leather and machinery, and the shipping of coal, cereals, and lumber. Schleswig is first mentioned in 804 as Sliestorp. It was made the seat of a bishopric in 948, and received municipal privileges in the twelfth century. It was the residence of the Danish Governor of Schleswig-Holstein from 1731 to 1846. In 1866 it passed to Prussia. Population, in 1900, 17,909.

SCHLESWIG-HOLSTEIN, hōl'stīn. A province of Prussia, occupying the most northerly part of the German Empire, with the exception of the district about Memel. It is bounded by Jutland on the north, the Baltic Sea, Lübeck, and Mecklenburg-Schwerin on the east, Hamburg and Hanover on the south, and the North Sea on the west (Map: Prussia, C 1). The former duchies of Schleswig and Holstein constitute the northern and southern halves respectively. Its area is about 7340 square miles. The surface is generally flat. The eastern coast land, which is indented by several deep and narrow fiords, and which is more elevated than the western, contains most of the agricultural land of the province. The interior is chiefly moorland, a continuation of the Lüneburg heath on the south. The soil along the western coast consists of marshy but fertile marine alluvium, and the land is here so low that it has to be protected from the sea by dikes. The west coast is lined by a series of sandy islands inclosing shallow lagoons, which are in great part dry at low tide. The principal rivers flow into the North Sea. The Elbe forms the southern boundary of the province, and the Eider separates the former duchies of Schleswig and Holstein. The province is traversed by several canals, the most important of which is the new Kaiser Wilhelm Canal, connecting the North Sea with the Baltic.

Agriculture is the chief occupation of the province. The production of wheat, rye, oats, barley, potatoes, hay, beets, etc., is considerable. Schleswig-Holstein has long been famous for its excellent cattle, which are exported all over the world for breeding purposes. Horses are also extensively raised. The fisheries are of limited extent. The oyster banks owned by the State show signs of exhaustion. The mineral production is small, and confined chiefly to iron and turf.

Manufacturing industries are little developed. Metal ware and some machinery are produced, and there are several textile mills, shipyards, sugar refineries, distilleries, etc. The advantageous position of the province between the North Sea and the Baltic has contributed largely to its commercial development, which is much greater than the natural resources of the province would warrant. The shipping is very considerable in the three chief ports of Altona, Flensburg, and Kiel, the last being also an important naval port. Administratively the province is conterminous with the District of Schleswig, the seat of government being at the town of Schleswig. In the Prussian Landtag the province is represented by 19 members in the Lower and 11 in the Upper Chamber. It returns 10 members to the German Reichstag. Population, in 1900, 1,387,587, almost wholly Protestant. There were 135,000 Danes. Danish is still the predominating language in the northern districts.

History. Schleswig was annexed to the German Kingdom in the tenth century and was constituted a so-called mark. The town of Schleswig became the seat of a bishopric in 948. The region was obtained by the Danish King Knut (Canute) from the Emperor Conrad II. in 1027, and for a long time it was administered as a separate sovereignty by members of the Danish royal house. In the course of the thirteenth century Schleswig was transformed into an hereditary duchy, which remained a fief of Denmark. In 1375 Schleswig passed into the possession of the counts of Holstein of the House of Rendsburg. Margaret of Denmark confirmed this union by a treaty in 1386, Schleswig continuing as before a Danish fief, with a provision that it should never be incorporated with Denmark. In 1460, after the extinction of the Rendsburg line, Schleswig and Holstein placed themselves under the rule of Christian I. of Denmark, of the House of Oldenburg. This union was in the nature of a dynastic one merely, and it was stipulated that Schleswig and Holstein should never be separated from each other. As ruler of Holstein the King of Denmark became a member of the Germanic body. In 1474 Holstein was erected from a county into a duchy. The Danes always regarded Schleswig as Danish and the mass of the people were until recently Danish. Under the House of Oldenburg the nobility became more and more Germanized. By the beginning of the nineteenth century the German population had become as numerous as the Danish. Holstein had at an early period become completely Germanized.

After the Napoleonic wars the King of Denmark entered the Diet of the German Confederation as Duke of Holstein. King Christian VIII., who ascended the throne in 1839, made it the chief aim of his policy to bring Schleswig-Hol-

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stein into a closer union with Denmark and to put an end to the peculiar form of dependence existing between the duchies and the rest of the monarchy. The popular sentiment in Denmark demanded that Schleswig at least be made an integral part of the Danish realm. In 1846 the King aroused great indignation in the duchies, where the Salic law of succession was held to obtain, by issuing a little patent in which he declared that in Schleswig, as well as in a part of Holstein, the succession would be regulated in the same manner as in Denmark. The importance of this declaration was increased by the fact that the early extinction of the Oldenburg line was anticipated. Christian VIII. died in January, 1848, and was succeeded by Frederick VII., the last of his dynasty, who announced his intention of incorporating Schleswig with Denmark. Thereupon the people of Schleswig-Holstein, aroused by the news of the February Revolution in France, rose in rebellion and appealed to their German brethren for aid. Germany was now in a state of revolution, and troops were despatched by Prussia and other States, which, with the Schleswig-Holstein forces, drove the Danes beyond the frontiers of Schleswig. Frederick William IV. of Prussia, who had engaged reluctantly in the contest and who was influenced by the hostile attitude of Russia and England toward the Schleswig-Holsteiners, concluded the armistice of Malmö in August, 1848. In 1849 Denmark ventured to renew the struggle. Her forces were repeatedly defeated, but in 1850 Prussia definitely abandoned the cause of Schleswig-Holstein, and the patriots were allowed to succumb to the superior strength of the Danes. At the beginning of 1851 Prussia and Austria intervened in favor of Denmark and the Schleswig-Holsteiners were compelled to lay down their arms. The European Powers in the London conference of 1852 upheld the claims of Denmark in regard to Schleswig and provided for the succession of Prince Christian of Glücksburg to the Danish throne in case of the extinction of the royal line. On the death of Frederick VII. in 1863 without heirs, Prince Frederick of Augustenburg put forward the claims of his house to the succession in Schleswig-Holstein under the Salic law, disregarding a renunciation made by his father, Christian of Augustenburg, in 1852, and asked the German Diet to declare the London protocol of no force. He was at once hailed as their lawful sovereign by the people of the duchies. Christian of Glücksburg, succeeding to the Danish throne as Christian IX., was compelled by Danish public sentiment to ratify the fundamental constitution for Denmark and Schleswig. The German Diet supported the claims of Augustenburg and declared a federal execution in favor of Holstein, sending federal troops there. At the close of 1863 a ducal government was established at Kiel under the Prince of Augustenburg.

Schleswig-Holstein now became a pawn in the great game which Bismarck was playing for the unification of Germany. (See BISMARCK; GERMANY.) Bismarck easily induced Austria to coöperate with Prussia in the affairs of the duchies. The German Diet was asked by the two Powers to demand the withdrawal of the Danish Constitution, and when the Diet refused to interfere in the affairs of Schleswig, Austria and Prussia made the demand themselves as an ultimatum, and upon the refusal of Denmark they at once began hostilities. Denmark hoped to resist long enough to secure intervention by other Powers, but neither France, England, nor Russia was inclined to interfere. In February, 1864, the allied forces advanced into Schleswig. The outnumbered Danes were forced back from one line of defense to another, and Christian IX. was compelled to accept humiliating terms of peace, embodied in the Treaty of Vienna of October 30, 1864. Schleswig, Holstein, and Lauenburg were ceded to Austria and Prussia. By the terms of the Convention of Gastein, August 14, 1865, the provisional government of Schleswig was assumed by Prussia and that of Holstein by Austria, Prussia purchasing Austria's right in Lauenburg. The other German States and the Prussian people vainly objected to these high-handed proceedings of the governments of Berlin and Vienna. The military occupancy of the two duchies by the rival Powers soon brought out their essential hostility. Austria finally placed the affairs of Holstein before the Diet of the German Confederation, whereupon Prussia charged her rival with a violation of the Gastein agreement and the Prussian troops entered Holstein, which the Austrians abandoned, throwing the whole question into the Diet (June, 1866). This was the immediate occasion of the Seven Weeks' War (q.v.), which was followed by the formal incorporation of Schleswig-Holstein with Prussia.

Consult: Osten, *Schleswig-Holstein in geographischen und geschichtlichen Bildern* (4th ed., Flensburg, 1893); Krüger, *Organisation der Staats- und Selbstverwaltung in der Provinz Schleswig-Holstein* (Kiel, 1888); Hass, *Geologische Bodenbeschaffenheit Schleswig-Holsteins* (ib., 1889); Sach, *Das Herzogtum Schleswig in seiner ethnographischen und nationalen Entwicklung* (Halle, 1896); Waitz, *Schleswigs Geschichte* (Göttingen, 1851-54); id., *Kurze schleswig-holsteinische Landesgeschichte* (Kiel, 1864); Handelmann, *Geschichte von Schleswig* (ib., 1873); and on the later history of the duchies, Droysen and Samwer, *Die Herzogtümer Schleswig und das Königreich Dänemark* (Hamburg, 1850); Gosch, *Denmark and Germany Since 1815* (London, 1862), one of the best accounts in English of the complicated question of the succession.

SCHLETTSTADT, shlĕt'stȧt. A town of Alsace-Lorraine, Germany, on the Ill, 27 miles south-southwest of Strassburg (Map: Germany, B 4). The thirteenth-century Gothic cathedral is one of the finest in Alsace. The eleventh-century Church of Saint Fides is also interesting. The town has a normal school and a public library. The principal industries are the making of wire rope, tanning, and lumbering. Schlettstadt was a free Imperial city in the Middle Ages. It was captured by the French in 1634 and strongly fortified. Population, in 1890, 9418; in 1900, 9306.

SCHLEY, shlā, WINFIELD SCOTT (1839—). An American naval officer, born in Frederick County, Md. He graduated at the United States Naval Academy in 1860, and as midshipman on the *Niagara* went on a cruise to China and Japan in 1860-61, and was promoted to the rank of lieutenant in 1862. After the outbreak of the Civil War he served on the *Winona* with the West

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Gulf blockading squadron. Subsequently he was attached to the *Monongahela* and *Richmond*, and took part in all the engagements preceding the capture of Port Hudson. From 1864 to 1866 he was executive officer of the *Wateree* of the Pacific squadron, attaining the rank of lieutenant-commander in the latter year. He was an instructor at the Naval Academy from 1866 to 1869, and in 1870 was assigned to the *Benicia* on the China station, where he remained three years, and distinguished himself in the capture of the Korean forts on the Salee River in June, 1871. In 1874 he was promoted to the rank of commander and was again detailed as an instructor at the Naval Academy. From 1876 to 1879 he commanded the *Essex* on the Brazil station. In 1884 he commanded the third naval expedition sent by the United States Government to the relief of Lieut. A. W. Greely (q.v.), and after passing through 1400 miles of ice found Greely and the six survivors of his band at Cape Sabine, Grinnell Land. From 1885 to 1889 Schley was chief of the Bureau of Recruiting and Equipment, and in 1888 attained the rank of captain. In 1889-91 he commanded the cruiser *Baltimore* in the Southern Pacific. After several years' service as a lighthouse inspector, he was placed in command of the *New York* in 1895, and in 1897-98 was chairman of the Lighthouse Board. He reached the rank of commodore in February, 1898, and after the formal declaration of war against Spain, although the lowest on the list of commodores, was placed in command of the 'Flying Squadron.' On May 13th he sailed southward from Hampton Roads in order to find and if possible destroy the Spanish fleet of Admiral Cervera. He touched at Cienfuegos, and after considerable hesitation and delay established the blockade of Santiago, in whose harbor it was finally ascertained on May 29th that the Spanish fleet lay. At the beginning of June Admiral Sampson arrived with his ships and assumed command. The blockade was maintained until the morning of the 3d of July, when the attempt of the Spanish squadron to escape from the harbor ended in its complete destruction by the American blockading squadron, which, during the temporary absence of Sampson, was under the command of Schley. The *Brooklyn*, with Commodore Schley on board, bore a conspicuous part in the contest, particularly in the pursuit and destruction of the *Christóbal Colón*, but a peculiar 'loop' movement which Schley ordered, and which blanketed the fire of some of the other battleships, and caused the *Texas* to deviate from her course in order to escape being run down, caused much adverse criticism. On August 10th he became a rear-admiral, and was appointed a member of the commission to arrange for the evacuation of Porto Rico by the Spanish. He retired from active service October 9, 1901. After the close of the war his conduct during the operations leading up to the battle off Santiago and in the battle itself became the subjects of criticism, both official and unofficial, to such an extent that Schley finally asked for a court of inquiry to investigate the charges brought against him. A court consisting of Admiral Dewey (president), and Rear-Admirals Benham and Ramsay, sat from September 21 to November 7, 1901, took the testimony of more than seventy-five witnesses, and on December 13th made its report. The 'majority' report, signed by all three members, found that, while Schley's conduct in the battle showed personal courage, in the operations prior to June 1st it was marked by "vacillation, dilatoriness, and lack of enterprise," that he was slow to obey express commands of his commander-in-chief, that his dispatches were "inaccurate and misleading," and that his 'loop' movement in the battle of July 3d was unseamanlike and unnecessary. Admiral Dewey presented a 'minority' report, upholding Schley in some minor respects. The recommendation of the court that no action be taken was subsequently approved by the President. Schley wrote in collaboration with James Russell Soley (q.v.) *The Rescue of Greely* (1886).

SCHLIEMANN, shlē'mân, HEINRICH (1822-90). A famous excavator and archæologist, born in Neu-Buckow, Mecklenburg-Schwerin. From the age of twelve to fourteen he studied in the Realschule in Neustrelitz and then became apprentice as grocer's clerk in Fürstenberg. After five years his health broke down, and he walked to Hamburg, where he shipped for South America as cabin boy. The vessel was wrecked off the Dutch coast, but Schliemann was saved and taken to Amsterdam. Here he held a humble position in a commercial house, but by his enormous industry acquired a knowledge of all the important modern languages. His ability and linguistic attainments were recognized by his subsequent employers, B. H. Schroeder & Co., in 1846, when they sent him to Saint Petersburg as their agent. In the following year he embarked in business on his own account. For the next sixteen years he was successful in business, traveled much, and by mere chance on July 4, 1850, being present in California at the time that State was received into the Union, became a citizen of the United States. He finally retired from business with a large fortune in 1863. He then settled in Paris, and gave himself up entirely to archæological studies. During the year 1868 he visited Corfu, Ithaca, the Peloponnesus, and Asia Minor, and finally, in 1870, began excavations in the Troad on the hill of Hissarlik, where he believed the remains of ancient Troy would be discovered. The excavations were continued by him for twelve years, and finally completed by Dr. Dörpfeld in 1892. Although many of Schliemann's extravagant claims as to the results obtained are untenable, the excavations which he began at Hissarlik were the first of a long series of undertakings which have given us new knowledge of the early civilization of the Greeks. From 1876 to 1878 he carried on excavations at Mycenæ, and in 1878 at Mount Athos, and at Ithaca. In 1881-82 he excavated at Orchomenos, and continued the work there in 1886. In 1884-85 he laid bare the ruins of the great palace at Tiryns, and in 1889 he returned to Troy. He died at Naples and is buried near the Ilissus at Athens. His many publications include: *Ithaka, der Peloponnes und Troja* (1869); *Trojanische Altertümer* (1874); *Mykenä* (1878; English ed., New York, 1878); *Ilois* (1881; English ed., New York, 1881); *Orchomenos* (1881); *Troja* (in an English ed., New York, 1883; German ed., Leipzig, 1884). His autobiography was edited by his wife (Leipzig, 1891). The best general account of Schliemann's life and work is to be found in Schuchhardt's *Schliemanns Ausgrabungen in Troja, Tiryns, Mykenä, Orchomenos, Ithaka* (2d ed., Leipzig, 1891),

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translated under the title *Schliemann's Excavations and Archæological and Historical Studies* (London, 1891).

SCHLIK, shlĭk, FRANZ, Count von (1789-1862). An Austrian cavalry general, born in Prague. In the campaign of 1813-14 he took a prominent part, winning the rank of major. In 1844 he had become field-marshal lieutenant, and in the winter of 1848 he was ordered into Upper Hungary at the head of a corps of only 8000 men, with which he at first carried on a successful campaign against a superior force, but was soon forced to retreat. He joined Windischgrätz's forces and contributed to the victory of Kápolna. In 1859 he commanded the second Austrian army, which formed the right wing at Solferino.

SCHLITZ, shlĭts, JOHANN EUSTACH VON GÖRTZ, Count of (1737-1821). A Prussian diplomat, born at Schlitz and educated at the University of Strassburg. In 1778 he went as the secret agent of Frederick II. of Prussia to Munich and Zweibrücken, with the special mission of preventing the cession of Lower Bavaria to Austria after the death of Maximilian Joseph. In 1779-85 he was Ambassador to Russia and rendered important services, though he failed to prevent Russia's withdrawal from her alliance with Prussia. After the death of Frederick II. he went to the Netherlands for the purpose of reconciling the Stadtholder's Government and the democratic party. From 1788 to 1806 he was the Prussian representative at the Imperial Diet at Regensburg. He took part in the peace congress held at Rastatt in 1797-99, and served as a member of the Imperial commission formed to execute the provisions of the Treaty of Lunéville (1801). He resigned from the State service after the Treaty of Tilsit (1807). His writings include: *Mémoires ou précis historique sur la neutralité armée* (1801); *Mémoires et actes authentiques relatifs aux négociations qui ont précédé le partage de la Pologne* (1810); *Mémoire historique de la négociation en 1778* (1812). His posthumous *Historische und politische Denkwürdigkeiten* were published in 1827-28.

SCHLÖMILCH, shlē'mĭlk, OSKAR (1823-1901). A German mathematician, born in Weimar. He studied at Jena, Berlin, and Vienna, became privat-docent at Jena in 1844, and two years later assistant professor. In 1849 he was called to the Polytechnic Institute at Dresden as professor of higher mathematics and analytical mechanics. He was widely known as editor (from 1856) of the *Zeitschrift für Mathematik und Physik* (Leipzig), usually called *Schlömilchs Zeitschrift*. He wrote: *Handbuch der algebraischen Analysis* (6th ed. 1881); *Analytische Studien* (1848); *Compendium der höhern Analysis* (1853); *Uebungsbuch zum Studium der höhern Analysis* (4th ed. 1888); *Grundzüge einer wissenschaftlichen Darstellung der Geometrie des Masses* (7th ed. 1888); *Analytische Geometrie des Raumes* (last ed. 1898). Consult *Zeitschrift für Mathematik*, vol. xlvi. (Leipzig, 1901; with portrait).

SCHLOSSER, shlŏs'sĕr, FRIEDRICH CHRISTOPH (1776-1861). A German historian, born at Jever, Oldenburg. He studied at Göttingen, was for several years a private tutor, then a librarian in Frankfort, and in 1817 was called to Heidelberg as professor of history. His most notable works are the *Geschichte des 18. Jahrhunderts*, continued by Schlosser in the later editions till the fall of Napoleon, and the *Weltgeschichte für das Deutsche Volk*; both have been translated into English and other tongues. Schlosser's historical writing was done from the ethical, rather than the severely critical point of view, and has enjoyed considerable popularity.

SCHLÖZER, shlĕt'sĕr, AUGUST LUDWIG VON (1735-1809). A German historian, born at Gaggstadt. He studied theology and the Oriental languages at Wittenberg and Göttingen, went to Stockholm and Upsala in 1755, and returned to Göttingen in 1759, to study music. From 1761 to 1769 he was in Saint Petersburg, and then became professor at Göttingen. The most important of his works are: *Allgemeine nordische Geschichte* (1772); *Weltgeschichte im Auszuge und Zusammenhange* (1792 and 1901), and *Vorbereitung zur Weltgeschichte für Kinder* (6th ed. 1806), with both of which he did pioneer work by a more intelligent and spirited treatment of universal history. Consult Zermelo's *August Ludwig Schlözer* (Berlin, 1875).

SCHLÖZER, KURD VON (1822-94). A German diplomat and historian, born in Lübeck, and educated at Göttingen, Bonn, and Berlin. He entered the Prussian service in 1850, became secretary of the legation at Saint Petersburg in 1857, at Rome in 1863, Minister of the North-German Confederation in Mexico in 1867, German Ambassador at Washington in 1871, and in 1882 Prussian Ambassador to Rome, where he took a prominent part in settling the Kulturkampf. He retired from public life in 1892. Among his works are: *Choiseul und seine Zeit* (2d ed. 1887); *Geschichte der deutschen Ostseeländer* (1850-53): and *Friedrich der Grosse und Katharina II.* (1859).

SCHLÜTER, shlü'tĕr, ANDREAS (1664-1714). A German sculptor and architect. He was born in Hamburg, as the son of a sculptor, studied in Italy, and, after spending three years at Warsaw as architect, was called in 1694 to Berlin as Court architect. But he lost the favor of Frederick I., and spent the last two years of his life in the service of Peter the Great, in Russia. Schlüter's most famous works are the decorations in the Potsdam 'Marmorsaal,' the main part of the Charlottenburg Castle, the Berlin Arsenal, with its masks of dying warriors, an equestrian statue of the Great Elector (1703, his masterpiece), the northern part of the Berlin Castle, and the mausoleum of Frederick I. and his consort. He is reckoned the greatest German sculptor of his day, and in Berlin alone there are more than eighty of his statues. For his biography, consult Klöden (Berlin, 1855), Adler (ib., 1862), and Gurlitt (ib., 1890).

SCHMALKALDEN, shmäl-käl'den, or **SMALCALD**. A town in the Province of Hesse-Nassau, Prussia, at the confluence of the Stille and the Schmalkalde, 18 miles southwest of Gotha (Map: Prussia, D 3). It has been largely modernized, but retains its double walls, ancient court house, and castle. Interesting features are the fifteenth-century Gothic church, with a famous organ, and the Luther fountain. There are iron mines and salt baths. The manufactures are chiefly of hardware. Schmalkalden is first mentioned in 874. It is famous as the scene

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of the formation of the German Protestant League in 1531. (See SCHMALKALDIC LEAGUE.) Population, in 1890, 7318; in 1900, 8726.

SCHMALKALDIC LEAGUE. The name given to the defensive alliance organized at Schmalkalden (q.v.), December 31, 1530, by a number of Protestant princes and Imperial cities, and formally concluded April 4, 1531. Chief among the organizers of the League were: John the Constant, Elector of Saxony; his son, John Frederick (who succeeded to the Electorate in 1532); and Philip, Landgrave of Hesse. The rulers of Saxony and Hesse were empowered to manage its affairs. The object of this alliance, which was soon greatly extended, was the defense of the religion and political freedom of the Protestants against the power of the Emperor Charles V. Against the League the Emperor, engaged as he was at the time in contests with the Turks and French, found himself unable to contend, and in 1532 he was forced to grant the religious peace of Nuremberg. Finally, however, in 1546, he resolved to turn his guns against the Protestants, and the War of the Schmalkaldic League ensued, in which the Emperor had the support of Maurice, the ambitious Duke of Saxony, of the Albertine line, who was induced to betray the Protestants by the promise of the Electorate of Saxony. The Protestant forces, under John Frederick, were totally routed at Mühlberg (April 24, 1547), and both the Elector and Philip of Hesse fell into the Emperor's hands. This defeat finished the war. The object of the League, the guaranty of the liberty of religion to the Protestants, was subsequently effected by Maurice, then Elector of Saxony, who, having rejoined the Protestants, by a brilliant feat of diplomacy and generalship compelled the Emperor to grant the Treaty of Passau (August 2, 1552), by which this freedom was secured. For references, see REFORMATION; also CHARLES V.; SAXE, MAURICE, COUNT OF; GERMANY.

SCHMARDA, shmär'dȧ, LUDWIG KARL (1819—). An Austrian naturalist and traveler, born at Olmütz, Moravia. He studied in Vienna, and became professor in 1850, at the University of Graz, where he founded the Zoölogical Museum, and in 1852 at Prague. In 1853-57 he traveled around the world, and in 1862 was appointed professor at the University of Vienna. For the Government he investigated the industry of fisheries on the Austrian (1863-65) and French (1868) coasts, and, after having retired from service in 1883, visited Spain and the African coast in 1884, 1886, and 1887. His publications include: *Andeutungen aus dem Seelenleben der Thiere* (1846); *Zur Naturgeschichte der Adria* (1852); *Die geographische Verbreitung der Thiere* (1853); *Zur Naturgeschichte Aegyptens* (1854); *Neue wirbellose Thiere* (1859-61); *Reise um die Erde* (1861); and a textbook for higher institutions, entitled *Zoologie* (1877-78).

SCHMARSOW, shmär'sô, AUGUST (1853—). A German art historian, born at Schildfeld, Mecklenburg-Schwerin, and educated in Zurich, Strassburg, and Bonn. He became docent of the history of art at Göttingen in 1881, professor there in 1882, at Breslau in 1886, went to Florence in 1892, and thence to Berlin in 1893. He founded the Florence Institute for the History of Art in 1888, and wrote biographies of David D'Angers, Ingres, and Proudhon in Dohme's *Kunst und Künstler; Leibniz und Scottelius* (1877); *Raphael und Pinturicchio in Siena* (1880); *Melozzo da Forlì* (1886); *Donatello* (1886); *Giovanni Santi* (1887); *Martin von Lucca* (1889); *Masaccio-Studien* (1895-96), with atlas; *Barock und Rokoko* (1897); and *Plastik, Malerei und Reliefkunst* (1899).

SCHMAUK, shmouk, THEODORE EMANUEL (1860—). An American Lutheran clergyman and author, born in Lancaster, Pa. He graduated at the University of Pennsylvania, and at the Lutheran Theological Seminary in Philadelphia, and went as pastor to Lebanon, Pa., in 1883. Afterwards he became literary editor of *The Lutheran* (1889), editor-in-chief of the *Lutheran Church Review* (1892) and of other Lutheran publications. His works include: *The Negative Criticism of the Old Testament* (1894); *Catechetical Outlines* (1892); and *Manual of Bible Geography* (1901).

SCHMEKS, shmĕks. See TÁTRAFÜRED.

SCHMELLER, shmĕl'lĕr, JOHANN ANDREAS (1785-1852). A German philologist. He was born at Tirschenreuth, Bavaria, and studied in Munich. His studies of German dialects began with Bavarian, and in 1821 he published *Die Mundarten Bayerns* (supplemented by a lexicon, 1827-36). From 1828 until his death he taught in the University of Munich. Schmeller edited the *Hêliand* (1830); the Old High German *Evangelienharmonie* (1841); the *Muspilli* (1832); *Lateinische Gedichte des 10. und 11. Jahrhunderts* (1836); *Carmina Burana* (1847); and Hadamar von Laber's *Jagd* (1850). His *Cimbrisches Wörterbuch* was edited by Bergmann in 1855. Consult Nicklas, *Schmellers Leben und Wirken* (Munich, 1885).

SCHMERLING, shmĕr'ling, ANTON, Ritter von (1805-93). A distinguished Austrian statesman, born in Vienna, where he studied law and in 1829 entered the Government service. As an opponent of Metternich's policy he was sent to represent Austria at the Frankfort Parliament, and presided over it after the retirement of Colloredo. Elected to the National Assembly, he advocated a constitutional monarchy, and was appointed Minister of Foreign Affairs and of the Interior by the Viceregent, Archduke John. Prussian influence having prevailed against his efforts to uphold the Austrian hegemony, he retired, and in Vienna entered Schwarzenberg's Cabinet as Minister of Justice, in which capacity he created the trial by jury. At variance with the reactionary policy of Prince Schwarzenberg, he resigned in 1851, soon after became chairman of the Senate of the Supreme Court, and in 1858 President of the Provincial Court of Appeals. The popular opposition to the federal October diploma of 1860 led to the appointment of Schmerling as Minister of State to promote the transformation of Austria into a constitutional monarchy, but his failure to overcome the opposition of the Hungarian Diet to his measures forced him to resign in 1865, whereupon he was appointed President of the Supreme Court. In 1867 he was made a life member of the House of Lords, where he repeatedly acted as first vice-president, and since 1879 led the party in opposition to the policy of Count Taaffe. For his biography, consult Arneth (Vienna, 1895).

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SCHMID, shmīt, CHRISTOPH VON (1768-1854). A German writer of juvenile works, born at Dinkelsbühl. His principal juveniles, which were very popular and were translated into French and English, are *Biblische Geschichte für Kinder, Der Weihnachtsabend, Genofeva, Ostereier, Das Blumenkörbchen*, and *Erzählungen für Kinder und Kinderfreunde* (1823-29). His autobiography, *Erinnerungen aus meinem Leben*, was published in 1871.

SCHMID, HERMANN VON (1815-80). A German novelist and dramatist, born at Weizenkirchen, Austria, and educated at Munich. In 1870 he became manager of the Gärtnerthor Theatre, but resigned the position after a few years. His plays, collected in 1853, include several historical dramas, such as *Karl Stuart* and *Columbus*, but his greater success was in portraying peasant life, as in *Die Z'widerwurz'n* (1878) and *Der Loder* (1880). In his novels, too, such as *Almenrausch und Edelweiss, Der Habermeister*, etc., he is at his best when describing Bavarian customs.

SCHMID, MATTHIAS (1835—). An Austrian genre painter, born at See, in the Paznau Valley, Tyrol. He got his early training in painting at home, and in 1853 went to Munich, where in 1856 he entered the Academy. In 1871 he became a pupil of Piloty and turned from religious subjects to satiric genre pictures of the Tyrolese priesthood, like "Mendicant Friars" and "A Judge of Morals" (1872). A later manner, free from anti-clerical animus, is shown in "The Betrothal" (1879), "His Reverence Lathered" (1883), "Going on a Pilgrimage" (1886), and "The Holiday Orator" (1893).

SCHMIDT, shmīt, ERICH (1853—). A German historian of literature, born at Jena, son of Oskar Schmidt. He studied Germanic philology and literary history at Graz, Jena, and Strassburg, established himself as privat docent at Würzburg in 1875, became professor at Strassburg in 1877, at Vienna in 1880, and director of the Goethe archive at Weimar in 1885. Thence he was called to Berlin in 1887, to succeed Wilhelm Scherer in the chair of German language and literature. Devoted almost exclusively to the investigation of modern literature, especially of the classical period, he published: *Richardson, Rousseau, und Goethe* (1875); *Lenz und Klinger* (1878); *Heinrich Leopold Wagner* (1879); *Beiträge zur Kenntnis der Klopstockschen Jugendlyrik* (1880); *Charakteristiken* (1st series 1886; 2d series 1900); and the excellent biography of *Lessing* (2d ed. 1899). He edited two volumes of the *Schriften der Goethe-Gesellschaft* (Weimar, 1886 and 1893); *Faust*, for the Weimar edition; and in 1887 he published *Goethe's Faust in ursprünglicher Gestalt* (3d ed. 1894), discovered by him in Dresden.

SCHMIDT, FRIEDRICH, Baron (1825-91). A distinguished architect, born at Frickenhofen, Württemberg. He studied under Breymann and Mauch in the Polytechnic at Stuttgart. At the age of eighteen he obtained work as a mason on the cathedral at Cologne, where after two years he became a master mason. In 1857 he was called to the Milan Academy as professor, and was awarded the contract for restoring the Church of Sant' Ambrogio. In 1859 he settled in Vienna, was appointed professor at the academy in 1860, architect of Saint Stephen's in 1863, and was raised to a baronetcy in 1888. His principal buildings in Vienna are the church of the Lazarists (1860-62), the parish church at Fünfhaus (1864-74), the gymnasium (1863-66), and the new city hall (1872-83), his most imposing work. He was one of the most eminent exponents of the Gothic style in German architecture. Consult Reichensperger, *Zur Charakteristik des Baumeisters Friedrich Freiherrn von Schmidt* (Düsseldorf, 1891).

SCHMIDT, GEORG FRIEDRICH (1712-75). A German engraver and designer, born in Berlin. He studied art there under Busch, and under Larmessin in Paris. In 1744 he was appointed engraver to Frederick II., in Berlin, and in 1757 he was summoned to Saint Petersburg by the Empress Elizabeth to engrave her portrait and to organize a school of engraving. His engravings and etchings in the style of Rembrandt rank with the best work of the eighteenth century in Germany. He engraved about 200 plates, the best of which are "The Empress Elizabeth of Russia," "Count Nicholas Eszterházy," "Pierre Mignard," "The Virgin and Child with Saint John," "The Raising of Jairus's Daughter," and "The Mother of Rembrandt."

SCHMIDT, HENRY IMMANUEL (1806-89). An American clergyman and educator. He was born at Nazareth, Pa., and was educated at the Moravian Academy and Theological Seminary of his native place. He joined the Lutheran denomination and during the earlier years of his career held pastorates in Bergen County, N. J.; at Boston, Mass., and at Palatine, N. J. He also taught at Hartwick Seminary, N. Y.; Pennsylvania College, Gettysburg, Pa., and later at the theological seminary of that place. In 1848 he became professor of the German language and literature at Columbia College. He was the author of a *History of Education* (1842; 10th ed. 1858); *The Scriptural Character of the Lutheran Doctrine of the Lord's Supper* (1852); *Course of Ancient Geography* (1860).

SCHMIDT, JOHANNES (1843-1901). A German philologist, born at Prenzlau, Prussia, and educated at Bonn and Jena. In 1868 he obtained a position as docent in comparative philology at Bonn and became adjunct professor in 1873. In the same year he was called to the professorship of comparative philology at Gratz, and in 1876 he accepted a similar chair in Berlin, where he remained until his death. His first important contribution was his 'wave theory' with reference to the relationship of the Indo-Germanic languages. (See PHILOLOGY.) Among the most important of his numerous works were: *Die Verwandtschaftsverhältnisse der indogermanischen Sprachen* (1872); *Ueber die Theilung des indogermanischen Sprachstammes* (1873); *Zur Geschichte des indogermanischen Vokalismus* (1875); *Die Pluralbildungen der indogermanischen Neutra* (1889); *Die Urheimat der Indogermanen und das europäische Zahlsystem* (1890); and *Kritik der Sonantentheorie* (1895). He was joint editor with Ernst Juhn of the *Zeitschrift für vergleichende Sprachforschung* from 1875 until his death.

SCHMIDT, JOHANN FRIEDRICH JULIUS (1825-84). A German astronomer, born in Eutin. He was employed in the Hamburg Observatory (1842-45), and for a short time at a private observatory at Bilk. He became assistant ob-

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server at Bonn (1846), observer at Olmütz (1853), and director of the observatory at Athens (1858), where he remained till his death. He studied the physical nature of comets and of the moon, the brightness and periodicity of stars, and physical geography, especially that of Greece. Besides his contributions to the *Astronomische Nachrichten* and to the *Publications de l'observatoire d'Athènes*, he published a revision of Lohrmann's chart of the moon (1877) and a very valuable independent chart (1878), and wrote *Der Mond* (1856), *Vulkanstudien* (1874), and *Studien über Erdbeben* (1875).

SCHMIDT, JULIAN (1818-86). An eminent German historian of literature, born at Marienwerder, West Prussia. He studied history and philology at Königsberg, taught in Berlin from 1842 to 1846, and went to Leipzig in 1847 as contributor to the *Grenzboten*, which he owned and edited, conjointly with Gustav Freytag, from 1848 to 1861. Returning to Berlin, he conducted for two years the *Berliner Allgemeine Zeitung*, then confined himself to the field of literary history. His first work of importance was the *Geschichte der Romantik im Zeitalter der Revolution und Restauration* (1847). His numerous critical articles for the *Grenzboten* formed the basis for his *Geschichte der deutschen Nationallitteratur im 19. Jahrhundert* (1853); 5th ed., revised and enlarged, under the title *Geschichte der deutschen Litteratur seit Lessings Tod* (1865-67). Into this was subsequently incorporated his *Geschichte des geistigen Lebens in Deutschland von Leibniz bis auf Lessings Tod* (1860-64), and both works appeared combined as *Geschichte der deutschen Litteratur von Leibniz bis auf unsere Zeit* (1886-96). Noteworthy are also *Geschichte der französischen Litteratur seit der Revolution 1789* (2d ed. 1873-74); *Uebersicht der englischen Litteratur im 19. Jahrhundert* (1859); *Schiller und seine Zeitgenossen* (1859); and the collections of ingenious essays *Bilder aus dem geistigen Leben unserer Zeit* (1870-74), and *Proträts aus dem 19. Jahrhundert* (1878). Julian Schmidt exercised more influence upon the period of German intellectual life in which he worked than has been accorded him. As a critic in journals and periodicals, his discussions comprised the entire scope of intellectual life in science, arts, and politics. The forte of his criticism, especially in regard to works of art, lay in an almost infallible instinct to perceive truth, power, and sterling worth, which quality enabled him to teach his contemporaries not to borrow their views of things from remote chains of thought, but to trust the spontaneity of their own feelings.

SCHMIDT, KARL (1812-95). An Alsatian Lutherian theologian. He was born and educated and died in Strassburg, and was professor of theology in the university from 1837 to 1877. He wrote, in French and German, numerous excellent works, of which may be mentioned his biographical studies of Gerson, Tauler, Roussel, Vermigli, Farel, Viret, Melanchthon, and Nicolas of Basel, and of the German and other mediæval mystics. His *Essai historique sur la société civile dans le monde romain et sur sa transformation par le christianisme* (1853) was translated into English under the title, *The Social Result of Early Christianity* (London, 1885).

SCHMIDT, MAX (1818-1901). A German landscape painter, born in Berlin, where he studied in the Art Academy under Begas and Schirmer. He was largely influenced in his choice of subjects and in his treatment by his familiarity with Egypt and Greece, and paid little heed to German scenes until 1854, but then treated them with rare poetic feeling. In 1868 he became instructor at the School of Arts in Weimar, and in 1872 went to the Königsberg Academy. His chief works are the Oriental frescoes in the Berlin Museum, "Wood and Mountain" (1868) and "A View on the Spree" (1877), both in the Berlin National Gallery. He wrote *Die Aquarellmalerei* (7th ed. 1901).

SCHMIDT, MAXIMILIAN (1832—). A German novelist and humorist, born at Eschlkam, Bavaria. He served with distinction in the Bavarian army from 1850 to 1872, when he retired and settled at Munich to devote himself exclusively to his literary work. Among the best of his numerous tales and novels, dealing vividly and realistically with the people and scenery of the Bavarian Mountains, should be mentioned: *Volkserzählungen aus dem Bayrischen Wald* (1863-69); *Der Schutzgeist von Oberammergau* (1880); *'s Austragsstüberl; Der Georgithaler* (1882); *Die Fischerrosl von St. Heinrich* (1884); *Der Musikant von Tegernsee* (1886); *'s Lisel von Ammersee* (1887); *Die Künischen Freibauern* (1895). Gradually these productions fell off in literary merit, as the author became more and more prolific. Lasting success attended his *Humoresken* (1892), the collection of dialect poems *Altboarisch* (1884), and several popular plays, dramatized from his novels. He also published the autobiography *Meine Wanderung durch 70 Jahre* (1902). His *Gesammelte Werke* appeared in popular edition of 34 vols. (Reutlingen, 1898-93).

SCHMIDT, NATHANIEL (1862—). An American Hebraist, born at Hudiksvall, Sweden, and educated at Stockholm University, at Colgate University, and at the University of Berlin. He was professor of Semitic languages and literature in Colgate University from 1888 to 1896, and then became professor of the same branches at Cornell. He contributed to the *Encyclopædia Biblica*, to the *Jewish Encyclopædia*, and to the *New International Encyclopædia*, and wrote: *Biblical Criticism and Theological Belief* (1897); *The Republic of Man* (1899); *Ecclesiasticus* (1903); *The Son of Man and the Son of God in Modern Theology* (1903).

SCHMIDT, OSKAR (1823-86). A German zoölogist, born at Torgau. After studying at Halle and Berlin, he began to lecture on zoölogy at Jena in 1846, became professor there in 1849, and successively at Cracow (1855), Graz (1857), and Strassburg (1872). His reputation is based upon the handbook of comparative anatomy, the 9th ed. of which, by Lang, was issued under the title *Lehrbuch der vergleichenden Anatomie der wirbellosen Tiere* (1888-94). He also wrote a *Lehrbuch der Zoologie* (1853), and for advanced classes *Leitfaden der Zoologie* (4th ed. 1882). From 1860 he devoted himself more especially to the investigation of Spongiæ, and published on this subject several treatises. His other writings include: *Goethes Verhältnis zu den organischen Naturwissenschaften* (1853), *Das Alter der Menschheit und das Paradies*, with Franz Unger

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(1866); *Descendenzlehre und Darwinismus* (1873 3d ed. 1884); and *Die Säugethiere in ihrem Verhältnis zur Vorwelt* (1884).

SCHMIDT, WILHELM ADOLF (1812-87). A prominent German historian, born in Berlin, where he studied history and philology, and in 1839 established himself as lecturer. In 1845 he became professor there, in 1851 at Zurich, and in 1860 at Jena. As a member of the Reichstag in 1874-76, he belonged to the National Liberal Party. His more important works include: *Geschichte der Denk- und Glaubensfreiheit im ersten Jahrhundert der Kaiserherrschaft und des Christentums* (1847); *Preussens deutsche Politik* (3d ed. 1867); *Zeitgenössische Geschichten: I. Frankreich von 1815 bis 1830. II. Oesterreich von 1830 bis 1848* (1859); *Elsasz und Lothringen* (3d ed. 1870); *Tableaux de la révolution française publiés sur les papiers inédits du département et de la police secrète de Paris* (1867-71); *Pariser Zustände während der Revolutionszeit 1789-1800* (1874-76); *Das Perikleische Zeitalter* (1877-79); *Abhandlungen zur alten Geschichte* (1888). He edited the 8th issue of Becker's *Weltgeschichte*, 22 vols. (Leipzig, 1874-79). Consult Landwehr, *Zur Erinnerung an Adolf Schmidt* (Berlin, 1888).

SCHMIDTLEIN, shmit'lin, JAKOB. A German theologian. See ANDREÆ, JAKOB.

SCHMIDT-RIMPLER, rim'plēr, HERMANN (1838—). A German ophthalmologist, born in Berlin and educated there. After acting as clinical assistant to Gräfe he went in 1871 to Marburg, where he started a university clinic for diseases of the eye, and whence in 1890 he was called to Göttingen. Soon afterwards he went to Halle. He wrote *Ueber Blindsein* (1882), *Augenheilkunde und Ophthalmoskopie* (1885; 7th ed. 1901), and *Erkrankungen des Auges im Zusammenhang mit anderen Krankheiten* (1898).

SCHMITZ, shmits, BRUNO (1858—). A German architect, born in Düsseldorf and trained in the academy of that city. He received the first prize for his design of a memorial to Victor Emmanuel in Rome and built a national monument in Indianapolis, a museum in Linz, and another in Stockholm, the new synagogue in Berlin, and the Kaiser Wilhelm Memorial on the Kyffhäuser, which, with memorials to the same Emperor at the Porta Westphalica and at Rheineck, near Coblenz, ranks him as one of the foremost of German architects.

SCHMOLLER, shmôl'lēr, GUSTAV (1838—). A distinguished German economist and historian, born at Heilbronn. He studied at Tübingen, in 1864 became professor extraordinary, and in 1865 professor ordinary at Halle. In 1872 he was called to the University of Strassburg, in 1882 to the University of Berlin. Schmoller gained at a comparatively early age a reputation as a leader of the historical school of economics. The great majority of his numerous books have been devoted to some phase of industrial history. He has done besides much work in the history of economic thought. Among his best known works are: *Strassburg zur Zeit der Zunftkämpfe* (1875); *Zur Litteraturgeschichte der Staats- und Sozialwissenschaften* (1888); *Das Merkantilsystem*, translated, *The Mercantile System* (1896); *Grundriss der allgemeinen Volkswirthschaftslehre* (1900). Since 1881 Schmoller has been editor of the *Jahrbuch für Gesetzgebung, Verwaltung und Volkswirthschaft im Deutschen Reich*. From 1878 to 1903 he edited a series of monographs entitled *Staats- und Sozialwissenschaftliche Forschungen*.

SCHMUCK'ER, BEALE MELANCHTHON (1827-88). An American Lutheran theologian, best known for his liturgical labors. He was born at Gettysburg, Pa., and studied there in college and in the theological seminary. He held pastoral charges in Martinsburg, Va. (1845-51), and in Allentown (1852-62), Easton (1862-67), Reading (1867-81), and Pottstown, Pa. (1881-88). With Mann and Germann he edited the American revision of the *Hallesche Nachrichten*. Schmucker founded many Lutheran schools and took a prominent part in the preparation of the common service now in use in the Lutheran Church.

SCHMUCKER, or **SMUCKER,** SAMUEL MOSHEIM (1823-63). An American author. He was born at New Market, Va., graduated at Washington College in Pennsylvania in 1840, became a Lutheran minister, was admitted to the bar in 1850, and devoted most of his later years to writing. His publications include: *Life of John C. Fremont, with his Explorations* (1856); *Life and Times of Alexander Hamilton* (1856); *Life and Times of Thomas Jefferson* (1857); *The Yankee Slave-Driver* (1857); *Life of Dr. Elisha Kent Kane and Other American Explorers* (1858); *Life and Times of Henry Clay* (1859); *Blue Laws of Connecticut* (1860); *History of the Modern Jews* (1860); and the first volume of *A History of the Civil War in the United States* (1863).

SCHMUCKER, SAMUEL SIMON (1799-1873). An American Lutheran divine. He was born at Hagerstown, Md.; graduated at the University of Pennsylvania, 1819; studied in Princeton Theological Seminary, and was ordained a Lutheran minister in 1821. He was pastor of a church in Newmarket, Va., 1820-26; professor of didactic theology and chairman of the faculty in Gettysburg Theological Seminary 1826-64. He was the leader of the low-church Lutheran party who are connected with the General Synod, and was better known outside of his communion than any other Lutheran minister. Of his numerous publications may be mentioned: *Fraternal Appeal to the American Churches on Christian Union* (1838), which prepared the way for the formation of the Evangelical Alliance; *The American Lutheran Church* (1851); *The Church of the Redeemer as Developed Within the General Synod of the Evangelical Lutheran Church* (1870).

SCHNAASE, shnä'ze, KARL (1798-1875). A distinguished German art-historian and jurist, with Rumohr, Waagen, and Kugler, one of the founders of modern art-history, who conceived art in its connection with the universal, cultural, and intellectual life. Born at Danzig, he began the study of law in 1816 and matriculated at Heidelberg also under Hegel, whom he followed to Berlin. Assessor at Königsberg in 1826, he was promoted to other positions at Marienwerder (1829), and at Düsseldorf, where he took great interest in the newly awakening artistic life, and in 1848 was appointed councilor at the Supreme Court in Berlin, but resigned in 1857 to confine himself to his studies. With Grüneisen and Schnorr he founded in 1858 the *Christliches Kunstblatt*, sojourned in Rome in 1865-66, and settled

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at Wiesbaden in 1867. As an author he made himself first known by his *Niederländische Briefe* (1834), which bore witness to his philosophic-historical conception of art, and was followed by numerous minor treatises and essays. His masterwork, however, is the *Geschichte der bildenden Künste* (1843-64; 2d ed. 1865-79), which created an epoch in the development of the modern science of art. In contradistinction to other art-histories, based on formal criticism, Schnaase in it sought to deduce the manifestations of artistic production from the physical, moral, and intellectual peculiarities of nations and to demonstrate how all other vital elements pervade artistic life. With rare universality of scientific training he treated art-history as an integral part of the history of civilization. Consult his biography by Lübke (Stuttgart, 1879).

SCHNABEL, shnä'bel, JOHANN GOTTFRIED (c.1690). A German author, who was known under the pseudonym of Gisander. During a part of his career he was in the service of Count Stolberg, but very few other facts concerning him are known. He wrote some of the best "Robinsonaden," or imitations of *Robinson Crusoe*, that appeared in German, such as *Wunderliche Fata einiger Seefahrer* (1731-43), *Die Inseln im Südmeere* (republished 1826), and the famous *Die Insel Felsenberg* (republished 1827).

SCHNECKENBURGER, shnĕk'*en*-bōōrk-ẽr, MAX (1819-49). A German poet, born in Thalheim, Württemberg. He was partner in an iron foundry at Burgdorf, near Bern. His best known poem, *Die Wacht amRhein*, although composed in 1840, did not become famous until the outbreak of the Franco-Prussian War. It was set to music by Karl Wilhelm.

SCHNEEBERG, shnā'bĕrk. A town in the Kingdom of Saxony, Germany, 19 miles by rail southeast of Zwickau (Map: Germany, E 3). Mining and lace-making are the main industries. Kobalt is chiefly mined. The Schneeberger brand of snuff is well-known. The late Gothic church contains a fine crucifixion by Cranach the elder. Population, in 1900, 8752.

SCHNEIDEMÜHL, shnī'de-mụl. A town of the Province of Posen, Prussia, 153 miles by rail northeast of Berlin (Map: Prussia, G 2). The town has handsome churches, a Catholic seminary, and a provincial deaf and dumb asylum. There are important glass works. Population, in 1900, 19,655, of whom 6399 were Protestants.

SCHNEIDER, shnī'dẽr, FRIEDRICH (1786-1853). A German composer, born at Alt-Waltersdorf, Saxony. He attended the Zittau Gymnasium and later the Leipzig University. In 1821 he was called to Dessau as Court Kapellmeister, having become famous the year previous by the production of his great oratorio, *Das Weltgericht*. While at Dessau he did much toward perfecting the Court orchestra, conducted the Singakademie, established the 'Liedertafel,' and founded a school of music in 1829, which flourished until 1854. Among his works are the oratorios, *Die Sündflut*, *Christus der Meister*, *Pharao*, *Gethsemane und Golgotha*, and *Absalom*. He also wrote masses, motets, pianoforte and violin music, symphonies, and songs.

SCHNEIDER, JOHANN GOTTLOB (1750-1822). A German classical philologist, born in Saxony, and educated at the universities of Leipzig and Göttingen. In 1776 he was appointed professor of ancient languages and history at the University of Frankfort-on-the-Oder, and in 1811, when the university was moved to Breslau, he went there as university librarian. He published many editions of the classical writers, particularly those relating to natural history. These include the works of Ælian, Nicander, and the *Scriptores Rei Rusticæ*; he further edited Xenophon, Vitruvius, Aristotle's *Politics*, *Natural History*, *Economics*, *Physics*, etc. One of the largest of his publications was a critical *Griechisch-deutsches Wörterbuch*, in 2 vols. (Züllich, 1797-98; 3d ed., Leipzig, 1819-21). Consult Bursian, *Geschichte der klassischen Philologie in Deutschland* (Leipzig, 1883).

SCHNEIDER, LOUIS (1805-78). A German actor and author, born in Berlin, the son of a musical conductor, whom he accompanied on his travels until, in 1820, he secured an engagement at the royal theatre in Berlin. For twenty-eight years a great favorite as a comedian there, he wrote several plays and operettas, the most successful of which were *Der Heiratsantrag auf Helgoland*, *Der Schauspieldirektor* and *Der Kurmärker und die Picarde*. When, in 1848, he retired to Potsdam, Frederick William IV. appointed him his reader and made him an aulic councilor, in which capacity he continued under William I. During the campaigns of 1866 and 1870-71 he accompanied the headquarters of the army as reporter for the *Staats-Anzeiger*. Besides the historical novel, *Der böse Blick* (2d ed. 1871), he published: *Geschichte der Oper und des königlichen Opernhauses in Berlin* (1852); *König Wilhelm* (1869); *Kaiser Wilhelm, 1867-71* (1875). Two works appeared posthumously and aroused great interest: *Aus meinem Leben* (1879-80) and *Aus dem Leben Kaiser Wilhelms* (1888).

SCHNEIDEWIN, shnī'de-vīn, FRIEDRICH WILHELM (1810-56). A German classical scholar. He was born at Helmstedt, and was educated at Göttingen, where he was professor of classical literature from 1837 until his death. His works include *Delectus Poësis Græcorum Elegiacæ, Iambicæ, Melicæ* (1838-39); *Beiträge zur Kritik der Poëtæ Lyrici Græci* (1844); Martial's *Epigrammata*, with critical commentary (1842; text, 1853 and 1866); and Sophocles, with critical commentary (7 vols., 1849-54, frequently reëdited by A. Nanck). After 1846 he edited the well-known *Philologus*, which he had founded.

SCHNETZ, shnĕts, JEAN VICTOR (1787-1870). A French historical and genre painter. He was born in Versailles, and studied in Paris under David, Regnault, Gros, and Gérard. He is important as marking a transition between the Neo-Classicists of the beginning of the nineteenth century and the Romanticists. Schnetz was made a member of the Institute in 1837, and director of the French Academy at Rome in 1840. Among his best works are the decorations of the ceiling in the Septième Salle, in the Louvre; "Vow to the Madonna" (Luxembourg); "Gypsy Woman Foretelling the Future of Sixtus V." (1820, replica Raczynski collection, Berlin); the "Vintager Asleep;" "Bride of the Goatherd." His best historical painting is "Saint Elizabeth," in Notre Dame des Bonnes Nouvelles, Paris.

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SCHNITZER, shnĭts'ĕr, EDUARD. A German traveler. See EMIN PASHA.

SCHNITZLER, shnĭts'lĕr, JOHANN (1835-93). An Austrian physician, famed as a pulmonary specialist, born at Gross-Kanisza, Hungary, and educated at Budapest and Vienna. He was assistant in Oppolzer's clinic from 1863 to 1867, and in 1878 became professor in the University of Vienna. He was the principal founder of the Vienna polyclinic. He wrote: *Pneumatische Behandlung der Lungen- und Herzkrankheiten* (1875); *Diagnose und Therapie der Laryngo- und Tracheostenosen* (1877); and *Lungensyphilis und ihr Verhältnis zur Lungenschwindsucht* (1880).

SCHNORR VON CAROLSFELD, shnôr fŏn kä'rôls-fĕlt, JULIUS (1794-1872). A German historical and religious painter. He was born at Leipzig, where he received his first instruction from his father, the painter Johann Veit Schnorr (1764-1841). He afterwards studied in the Academy at Vienna, from which he seceded with the group of painters headed by Overbeck, going to Rome in 1815. (See PRE-RAPHAELITES.) His share in their joint commission to decorate the Villa Massimi was a fresco of Orlando Furioso—his principal work at Rome. In 1827 he was appointed professor in the Academy of Munich and commissioned by King Louis I. to decorate five rooms of the Königsbau with frescoes from the Nibelungenlied, and three rooms in that part of the royal palace called the Festsaalbau with encaustic paintings of subjects from the history of Charlemagne, Frederick Barbarossa, and Rudolph of Habsburg. In 1846 he was made professor in the Academy and director of the picture gallery at Dresden.

Schnorr's painting shows the general characteristics of the Nazarite Brotherhood (see OVERBECK; PRE-RAPHAELITES), except that it is less extreme, both in spirit and technical methods. His *Bibel in Bildern*, an admirable work, enjoyed wide popularity. His principal easel paintings include the "Alms of Saint Roche" (Leipzig, Museum), and the "Family of John the Baptist Visiting the Family of Christ" (Dresden Gallery). Consult Valentin, in Dohme, *Kunst und Künstler des XIX. Jahrhunderts* (Leipzig, 1882).

SCHNORR VON CAROLSFELD, LUDWIG FERDINAND (1789-1853). A German painter, born at Leipzig, brother of the preceding. He studied at the Vienna Academy, of which he became a member in 1835, and was appointed custodian of the Belvedere Gallery in 1841. His works include "The Erl-King" (1821, Ferdinandeum, Innsbruck); "The Liberation of Peter" (1836, Dresden Museum); and "Christ Feeding the Four Thousand" (1839, ib.).

SCHOELCHER, shĕl'shâr', VICTOR (1804-93). A French politician, born in Paris. He is chiefly known as an advocate of the abolition of slavery in the French colonies. With a view to studying all the aspects of the question, he traveled in Mexico, Cuba, and the United States in 1829. In 1848, as Under-Secretary for the Navy, he secured the passage of a law abolishing slavery in the French colonies. He was a member of the Constituent Assembly and of the National Assembly from 1848 to 1850 and voted with the Extreme Left. Expelled from France after the coup d'état of December 2, 1851, he remained in England till the fall of the Second Empire, when he returned to France, and during the siege of Paris commanded the artillery of the National Guard. Among his writings are an English *Life of Handel* (1857); *Des colonies françaises, Abolition immédiate de l'esclavage* (1842); *La famille, la propriété et le christianisme* (1837); *Le vrai Saint-Paul* (1879); and *Vie de Toussaint Louverture* (1889).

SCHÖFFER, shĕf'ĕr, PETER (c.1425-c.1503). An early German printer. He was born at Gernsheim, and in early life was a copyist in Paris. About 1450 he became an assistant in the printing establishment of Gutenberg and Fust, at Mainz. After the retirement of the former, he became Fust's partner, and with him printed the *Psalter* (1457). He is said to have introduced many improvements in the art of printing, but his claim to the discovery of the method of casting metal types is not generally recognized. He married the daughter of Fust.

SCHOFIELD, skō'fēld, JOHN MCALLISTER (1831—). An American soldier, born in Chautauqua County, N. Y. He graduated at West Point in 1853; was assistant professor of natural and experimental philosophy there from 1855 to 1860, and was then for a time professor of physics at Washington University, Saint Louis, Mo. On the breaking out of the Civil War he became major of the First Missouri Volunteers, served as chief of staff for General Lyon during the operations in Missouri, and took part in the battles of Dug Spring and Wilson's Creek. Afterwards as brigadier-general of volunteers he commanded the State troops and the district of Saint Louis, until placed in command of the Army of the Frontier in 1862. In November, 1862, he was promoted to the rank of major-general of volunteers. In 1864 he was assigned to the command of the Army of the Ohio. In Sherman's campaign in Georgia he commanded the Twenty-third Corps. He received his appointment as brigadier-general in the Regular Army for his services at the battle of Franklin (q.v.), November 30, 1864, in which he defeated the Confederates under General Hood. With his command he was transferred to North Carolina, and was appointed to the command of that department. On February 22, 1865, he occupied Wilmington, fought the battle of Kinston March 8-10th, and joined Sherman at Goldsboro, March 22, 1865. He was Secretary of War *ad interim* from May, 1868, to March, 1869; was then placed in command successively of the Department of the Missouri and of the Division of the Pacific. In July, 1876, he was appointed superintendent of the United States Military Academy, and from 1882 to 1883 had command of the military division of the Pacific. He then commanded successively the divisions of the Missouri and of the Atlantic, and was Commanding General of the United States Army from 1888 to 1895, when he retired with the rank of lieutenant-general. He published *Forty-six Years in the Army* (New York, 1897).

SCHOLASTICISM (from Lat. *scholasticus*, Gk. σχολαστικός, *scholastikos*, relating to school, learned, from σχολή, *scholē*, learning, leisure, school). A term applied in its commonest acceptation to the teaching of those who devoted themselves in the mediæval schools to the sciences, especially philosophy and theology. Not only the latter branches, however, but the whole

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speculative science of the Middle Ages, is sometimes included under the term scholasticism. This, however, is obviously an exaggeration, since mediæval speculation ran in such markedly diverging channels as the Arabian, Jewish, and Greek philosophies, while against the current of genuine scholasticism there were all along two directly anti-scholastic movements—pure rationalism and mysticism. Again, scholasticism is not unfrequently made to stand for a method of demonstration chiefly characterized by fideism, apriorism, logomachy, endless subtlety, and hair-splitting, whose sole organ is supposed to be the deductive syllogism. This interpretation, however, is justified only as regards the method of its adherents of inferior rank, and of its formative and declining periods.

Scholasticism is essentially a *Weltanschauung*—a synthetic view of the universe, embracing the world, man, and God with their inter-relations, in so far as this is attainable by the aid of experience, reason, and revelation coöperating in due subordination. Thus regarded it is, subjectively, one of the countless efforts of the human mind to obtain a unified comprehension of reality. Objectively and in its developed form, scholasticism is a systematized result of this striving for unity, an orderly synthetic view of reality.

Among the peculiarities which on the whole differentiate it from other world-views the following especially deserve attention: (1) The completeness of its criteria, and consequently of the materials which, resulting from their coordination, combine in its composition. Consciousness, sense-experience, intellectual intuition, reasoning, inductive and deductive demonstration, human testimony conjoin in it with divine revelation in the endeavor to ascertain the ultimate nature of the reality that presents itself to the mind. Sense-experience and the inductive process were, it is true, inadequately and uncritically employed by the mediæval scholastics, but this defect has been made good by their modern successors. (2) Its method combines analysis with synthesis, induction with deduction—a union which, harmonizing the process of inquiry and proof with man's dual nature, can alone, it is asserted, engender intellectual perfection. (3) The continuity of its evolution. The beginnings of scholasticism are traced historically to Socrates, the results of whose search for the permanent element in the contingent, the universal in the particular, were developed by Plato. The Platonic system was pruned of its idealistic excrescences and its extremely dualistic view of human nature by Aristotle. Into the Greek synthesis Saint Augustine built many of the conceptions derived from Christian revelation; and thus enlarged and interpreted, it passed through the more immediately formative stages of the earlier Middle Ages, and through the hands of Saint Anselm, to receive a mature development in the thirteenth century under the influence of Saint Thomas Aquinas. Then followed the age of decline and arrested progress. In the second half of the nineteenth century it came forth in renewed vigor, and has since been assimilating to its organism the results of philosophical criticism and empirical research. The scholastic synthesis is therefore the outcome of a rational eclecticism on independent and original lines.

Its philosophical content is mainly derived from Aristotle, though in following him the schoolmen were by no means servile. Other systems, Platonism, Neo-Platonism, Stoicism, Pythagoreanism, as well as the philosophical speculations of the Fathers, enter into its body. Its theological content is the truths of revelation as gleaned from the Bible, ecclesiastical tradition, and the authoritative pronouncements of the Church. Scholasticism has also been defined as the application of Aristotle to theology, or the expression of the facts and realities of revelation in the mind-language of the Peripatetics. The definition is true so far as it goes, but is inadequate. The inference, however, should not be drawn that the Catholic Church has committed herself to Aristotle's philosophy. She makes use of it, indeed, as a standard of expression, but she indorses none of its tenets that are not necessarily accepted by plain common sense; for, like every other philosophy, it contains elements implicated in the very nature of the mind, combined with other peculiar debatable features which are the product of human ingenuity.

History of the Scholastic Movement. The more immediate history of mediæval scholasticism may be divided into four periods: (1) The formative period, reaching from the ninth to the closing of the twelfth century. (2) The period of maturity. (3) The period of decline. (4) The subsequent stage culminating in what is known as Neo-scholasticism of the present day. Two distinct currents run through the history of mediæval speculation—the strictly *scholastic* and the *mystical*. Indications of the divergence of these two streams are noticeable in the Patristic period, but the distinction became broad and deep in the Middle Ages. Scholasticism represents the speculative, mysticism the contemplative phase of thought. Scholasticism strives to comprehend truth by the investigations of reason; mysticism by the methods of contemplation, by the sympathies and emotions of the heart. The two schools, however, were at one in their reverence for Christian truths, and whatever their differences on other points, they supplemented each other's teaching and, on the whole, so counterbalanced one another as to prevent either from pushing its doctrine to a dangerous extreme.

During the first period the broader outlines of the scholastic synthesis were gradually laid. The first attempts were vast accumulations of raw material, general cyclopædias or summaries of the intellectual possessions of the age, like the *Origines* of Isidore of Seville, the *De Natura Rerum* of Bede, and the *De Universo* of Rhabanus Maurus. Gradually the special philosophical problems differentiate themselves, and the broken threads of the ancient and patristic traditions are gathered up. The dominant subject of study was dialectic, and the question of the nature of universals, with which the period may properly be said to have opened, mainly absorbed attention. There speedily developed a ridiculous despotism of formal logic, mainly due to the wrong philosophical orientation of the early schoolmen owing principally to their meagre supply of philosophical literature. The earlier scholastics drew their doctrines from conflicting sources. Mutilating one author, misunderstanding another, ignoring in all the historical and logical relation, they elaborated irregular systems without always knowing how to escape in-

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consistency. In dialectics Aristotle held undisputed sway. Metaphysics was a bizarre union of Aristotelian and Platonic ideas. From the *Timæus* was borrowed the theory of the principle of causality, from Aristotle the scheme of the four causes. The Platonic doctrine of ideas was brought to the front together with the Aristotelian theories of substance, nature, person, and the categories. Indirectly, through Saint Ambrose and Boëthius, the composition of matter and form was known, though this organic doctrine of the Peripatetics plays but an insignificant part and was always misunderstood. Cosmological teachings show the same uncertainty. Under the influence of the Platonic theory of the world-soul, or the *fatum* of the Stoics, an autonomous life was attributed to nature, though, on the other hand, some of the ablest of the schoolmen (Abélard, John of Salisbury) maintained with Aristotle the individuality of every natural substance, two theses that it is impossible to reconcile.

Up to the thirteenth century the psychology of the schools is principally Augustinian and Platonic. Man is a microcosm, a mirror of the universe. From Saint Augustine is taken the division of faculties and the theory of knowledge. To these studies on the psychical activities were united observations on the empirical and physiological life, inspired by Arabian science. On the nature of man, whatever concerned the origin and destiny of the soul was eagerly studied. The relation between body and soul was explained on the Platonic theory—the soul being held to be united to the body as the pilot to the ship, the rider to his horse. Although the Aristotelian definition of the soul as 'the *actus primus* of the body' was well known, the soul was not held to be the *substantial form* of the organism, for this, according to the conceptions of the time, would have been to regard it as a property of matter. Theodicy was always considered as one of the most important chapters in scholastic philosophy. The Fathers of the Church, the pseudo-Dionysius, and Boëthius had left long dissertations on the existence of God; therein are found the Aristotelian ideas on the prime mover, the Neoplatonic conceptions of the demiurge, of a Supreme Being, and the Pythagorean traditions on number. On the whole, if we except theodicy, which, fragmentary though it was, remained faithful to the true genius of scholasticism, in the philosophy of this period the effort to amalgamate heterogeneous and incompatible elements was the chief defect.

The scholastic movement reaches its fullest mediæval development in the thirteenth century with the great teachers of the age, Albertus Magnus, Saint Thomas Aquinas, Saint Bonaventura, and Duns Scotus. Its dominant traits are now: (1) Comprehensiveness. Acquainted with all the problems suggested by a complete philosophical system, the scholastics offer definite solutions ready for unitive coördination. (2) Individuality of the philosophers. The thirteenth century was a century of individualities. While all the great schoolmen agreed in a number of fundamental theories, each of them imprinted upon this common fund the mark of his personality. (3) The prominence given to psychological and metaphysical problems. In psychology, the genesis of knowledge and the nature of the soul; in metaphysics, the theories of matter and form, of the nature and of the origin of substances, of the principle of individuation sum up the main subjects of controversy.

The intensity of Christian faith among the contemporaries and successors of Charlemagne explains the ingress of scholastic philosophy upon the domain of theology. The dispute concerning predestination raised the problem of liberty and its relation to God's providence and justice; the controversy of Paschasius on the Eucharistic Presence occasioned dissertations on substance and accident; the dogma of the Trinity suggested discussions on the concepts of nature, individuality, person; the mystery of transubstantiation and of the divine simplicity provoked the study of physical processes. However, before long the philosophical questions were disengaged from their theological setting. Distinction between the two sciences was deduced from the diversity of their principles, their methods, and their special objects, a distinction which is explicitly laid down and developed in the first question of the *Summa Theologica* by Saint Thomas.

The decline of scholasticism followed rapidly on its maturity. The causes which led to its ruin acted slowly but steadily. Of these causes some are internal, the exhaustion of the movement itself; others external, the decline of studies, and the progressive encroachments of anti-scholastic philosophies. Lack of originality is the first symptom of this decay. From the fourteenth century the number of those who devoted themselves to the study of philosophy grew in colossal proportions. Universities multiplied, and thus facilitated the growth of philosophical pursuits. Entire orders engaged in the prevalent controversies. But these multitudinous philosophers no longer thought for themselves. They enrolled themselves with some great school, led by some illustrious thinker. As with all the writers of periods of decline, they were mere commentators upon the thoughts of others.

As schools increased individuality decreased. The thirteenth century was marked by distinct personalities; the fourteenth and fifteenth were periods of impersonal thought. Apart from the *Terminists* the schoolmen after the thirteenth century discovered no new modes of speculation. But terminism was a symptom of decay, for in its work is noticeable another mark of decomposition which was not slow to invade all scholasticism, the deterioration in the scholastic synthesis. The new theories, those of Occam, for example, were at ill accord, in more than one point, with the scholastic synthesis, without, however, being in conflict with its organic principles. The passionate disputes of the Terminists, Scotists, and Thomists also largely contributed to disturb the economy of scholasticism.

Scholasticism itself departed further and further from the dignified and precise language of the thirteenth century. Uncouth expressions which hitherto had appeared only sporadically and for the most part in Arabo-Latin translations multiplied rapidly from the fourteenth century; even the spelling in use with professors betrayed an unpardonable ignorance of Latin. Terminism and Scotism must assume the greater part of the responsibility for this decadence. And as defect in form engenders confusion of ideas there appears also a deterioration in scholastic methods. Under pretext of clarity, distinctions, sub-distinctions, terms, and counter-terms were

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multiplied. These abuses were furthered by the progressive advance of an exaggerated dialectic. The thirteenth century looked upon dialectics in theory and practice as a mental discipline preparatory to the study of physics, metaphysics, and morals. The altering of this relation inevitably led to the despotism of formalism. There were some symptoms of this intellectual malady at the beginning of the fourteenth century; it progressed gradually until it had undermined the vitality of scholasticism.

Mental enervation became apparent in the intellectual centres of the time—the religious Orders and the universities. The former remained for the time the principal nurseries of science; but zeal for study lessened as discipline relaxed. Among the many teachers eager for quick results there were comparatively few who by personal and persevering effort rose above the prevailing mediocrity. The University of Paris fell rapidly from its grandeur, and scholasticism, which had risen with it, was dragged down in its fall. Yielding to intrigue, the Faculty of Theology trifled with academic rules; they facilitated the 'actus scholastici,' shortened the years of study, and made examinations matters of form. The Faculty of Arts fell into a like condition and thus brought on its own ruin. The arts being an obligatory stage to theology, men with money and ambition had an obvious interest in abridging their study as much as possible.

While scholasticism as a movement was passing through these days of storm and stress its synthesis was preserved intact. Men of mental breadth and insight like Cajetan (1496-1534), Franciscus Sylvestris Ferrariensis (1474-1528). Bañez (1528-1604), Vasquez (1551-1604), Toletus (1532-1596), and above all Suarez (1548-1617), preserved and developed the scholastic organism.

During the nineteenth century philosophers like Kleutgen and Stöckl in Germany; Ozanam, De Broglie, Farges, Blanc, Gardair, and many others in France; Liberatore, Sanseverino, Cornoldi, and Zigliara, in Italy; Balmes and Cortes, in Spain; Ward and Harper, in England, have been bearers of the scholastic teachings to the present age. A strong impulse to the Neoscholastic movement was given by Leo XIII. in many public utterances, notably by his encyclical *Æterni Patris* (1879), in which he urges a return to the study of the great schoolmen, especially Saint Thomas, not, indeed, with a view to a wholesale reimportation of scholasticism in its full mediæval content, but with an eye to its extension, completion, and adaptation to the intellectual requirements and modes of thought of the present age. A valuable aid in this direction is the critical edition of the works of Saint Thomas now being published at Rome under the Papal auspices. The establishment at Louvain of the 'Institut Supérieur de Philosophie' under the presidency of M. Mercier was also largely due to the broad policy of Leo XIII. A systematic series of works on Neoscholasticism emanates from the Institute, as does likewise the *Revue Néoscholastique*, a quarterly now in its tenth year. The *Revue de Philosophie* (Paris), the *Philosophisches Jahrbuch* (Fulda), the *Annales de Philosophie Chrétienne* (Paris), and *Divus Thomas* (Piacenza) are among the well-known periodicals devoted to the same movement.

THE SCHOLASTIC SYNTHESIS. So much for the history of scholasticism as a movement. The result, the synthesis, can be here barely touched upon. The scholastic sees the world of reality with the triple eye of sense, reason, and faith. These *organa* are distinct, and each is in its limited sphere independent. They are all necessary to a complete survey of reality, and, under normal conditions critically discernible, are mutually corroborative. Under their harmonious interaction the world of reality is seen to embrace Creator and creature, the latter emanating from the former as from its primary archetypal and efficient cause. The irrational world is synthesized in the rational, and by it, through a reasonable service active and passive, referred to its first principle and final end. The method, way, and means to this return of the creature to the Creator is manifest in the synthesis of both, the Incarnate Word and His organized economy. These are the broad lines of the scholastic synthesis.

Separated from the elements derived from revelation, the purely rational lines of the synthesis are the following. It is the aim of philosophy to interpret the universal order of things in its constituent, efficient, and final causes. That order is made up of four departments as manifested under as many ascending degrees of intellectual abstraction: (1) The *real* order which the mind considers but does not make, and which falls under the scrutiny of physics, mathematics, and metaphysics; (2) the *mental* order which the mind makes by reflectively considering its own acts, the sphere of logic; (3) the *moral* order which the mind makes by reflective consideration of the acts of the will, the domain of ethics; (4) the *external* order which the mind makes in considering man's external productive acts, the order of the arts liberal and mechanical.

The supreme synthetic ideas of the metaphysical order are *act* (perfect determination) and *potency* (determinability). On these rests the distinction between the infinite—whose existence is demonstrated *a posteriori*—as *actus purus*, unalloyed perfection, and the finite being combining act with potency. The relations of God, the Infinite, to the finite are inferred from His intelligence and will, and are summed up under three:

(1) Exemplarism: The divine ideas, or the different phases of God's essence perceived by His intellect as imitable outwardly, are the ultimate ontological basis of all finite realities and the ultimate basis of their cognoscibility and our rational certitude, (2) Creationism: The finite proceeds from the Infinite as the term of the creative act. God's creative efficiency terminates at the very substance of the finite; in this conception the scholastic transcends the Aristotelian concept of the *causa motrix*. (3) Providence: The Creator is necessarily conserver and provider. The finality immanent in creation and directed to an ultimate rational purpose is conceived by the scholastics in a higher and more consistent light than it was by the ancient Greeks.

The mingling of potency and act, the determinable and the determined, shows itself in the finite by a triple composition—(1) that of matter and form; (2) the individual and the general essence; (3) essence and existence. (1) The duality of matter and form was derived from the Aristotelian theory of physical processes and trans-

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ferred to metaphysics. In the corporeal world everything is constituted of a homogeneous and a heterogeneous principle, of a principle of difference and unity, of passivity and activity. The root of the one is matter, of the other form. Matter cannot subsist without form. The highest forms, the human soul and supernal spirits, can exist without matter. Form is the root of specification; matter of individuation; but in this capacity matter must be considered in connection with quantitative dimensions. Form is to matter as act to potency. (2) In the finite individual the individuation and the abstract essence are not really, but only virtually distinct. This gives the mind a basis for abstracting the essence—the direct universal (*universale in re*)—and elaborating it by comparison and reflection into the reflex universal (*universale post rem in mente*). The individual is to the essence, the singular to the universal, as act to potency. (3) Essence and existence in the finite are really distinct after the analogy again of act and potency.

Mathematics and physics may be here dismissed. Scholastic physics was based on the Peripatetic and manifests its shortcomings, but together therewith an insight into physical processes and the phenomena of motion which theoretical physics of the present age cannot afford to despise.

Psychology was with the schoolmen, as with Aristotle, a branch of physics, a point of view to which recent physiological psychology has returned. The soul is united to the body as form to matter. The soul is therefore the root of unity and activity in the organism. From it all vital operation, vegetative, sensitive, intellective, appetitive, locomotive, proceeds. The immediate principles of these operations are the powers or faculties, all of which are rooted in the soul, though the senses—the inner and the outer senses and the sensuous appetites—are blended with the chemical matter of the organism, on which they therefore intrinsically and essentially depend. Other powers transcend the material organism as such, and, though dependent thereon for their object matter, operate with a certain autonomy of their own. These intrinsically dependent energies are the intellect and will. Being immaterial, they manifest the immateriality of their root, the substance of the soul. The soul is, therefore, no product of matter. It is the term of the creative act, and, being simple and immaterial, is necessarily incorruptible, i.e. immortal.

Scholastic epistemology is based on the principle that knowledge sensuous and intellective consists in the assimilation of object to subject—an assimilation engendered by the coöperation of the two. The stimulation of the psychic cognitive power by the object was called the *species impressa*, the reaction of the faculty the *species expressa*. In intellective cognition the object is presented through the phantasm from which the active intellect abstracts the intelligible species. In the wake of cognition follows appetition sensitive or intellective. The latter—the will—is like every other power necessitated as to its general object, the good as such; though in respect to this or that good it is undetermined and intrinsically free.

Ethics was dominated by the concept of finality immanent in man as it is in the universe. Man's objective end is the vision of the infinite truth and the enjoyment of the infinite good, i.e. God. He is physically free, however, to place his end in the finite. If he do he will fail of his ultimate perfection and incur unending loss. The natural law of conduct is the reflection of the eternal law in consciousness. Acts are good or bad according as they are in accord or discord with human nature in its concrete existence. Special ethics and politics unfold and apply the natural law to the special individual relations of man.

There are obvious objections to the scholastic synthesis. It is accused of being one-sided, of neglecting the historic and inductive method, of being unprogressive, of merely unfolding what was already contained in received data, of bringing no new facts to light, but simply analyzing the facts at hand which it took for granted. All these and other such charges may with some obvious restrictions be admitted. Nevertheless scholasticism centred the human mind on certain fundamental truths essential to the complete spiritual development of the race.

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SCHOLIASTS, skō'lĭ-ăsts (MGk. σχολιαστής, *scholiastēs*, commentator, from σχολιάζειν, *scholiazein*, to write commentaries, from σχόλιον, *scholion*, commentary, from σχολή, *scholē*, learning, school). A name applied to annotators of classical works, especially Greek. These commentaries, *scholia*, were written on the margin or between the lines of the manuscripts, and included explanations and interpretation of every kind. The earliest form of interpretation consisted of nothing more than glosses on difficult or unusual words, but with the Alexandrians learned comment in the larger sense began and continued through the Byzantine Age. In Latin we have important scholia to Terence, Vergil, Horace, Statius, and others. For a history of the Greek annotators of antiquity, consult Wilamowitz-Muellendorf, *Herakles*, introduction to vol. i. (Berlin, 1889).

SCHÖLL, shēl, ADOLF (1805-82). A German archæologist and critic, born at Brünn, Austria, and educated at Tübingen and Göttingen. In 1843 he was appointed director of the Art Institute in Weimar, where he was made librarian-in-chief in 1861. He wrote *Die Tetralogien der attischen Tragiker* (1839), *Sophokles* (1842), *Weimars*

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Merkwürdigkeiten (1847), and many contributions to the criticism of Goethe. Consult the biography by his son Friedrich (Berlin, 1883).—His son RUDOLF (1844-93) was born in Weimar and after studying at Göttingen and Bonn traveled in Italy with Theodor Mommsen. He was successively professor at Greifswald, Jena, Strassburg, and Munich. He wrote *Legis Duodecim Tabularum Reliquiæ* (1866) and *De Synegoris Atticis* (1875).—His brother FRIEDRICH (1850—) studied at Göttingen and Leipzig, and in 1877 became professor at Heidelberg. Best known as a pupil of Ritschl, Schöll was one of the co-editors of the Teubner text of Plautus (1892-95).

SCHOLL, shôl, AURÉLIEN (1833—). A French journalist, dramatist, and miscellaneous writer, born at Bordeaux. Having studied at the Collège de Bordeaux, he went to Paris in 1850. He founded successively *Le Nain Jaune*, *Le Club*, *Le Jockey*, *Le Lorgnon* (1869). After the Franco-German War he was on the staff of *L'Evénément* (1872-82), then editor-in-chief of *Le Voltaire* (1882-83), and an editor of *L'Echo de Paris* (1883-85). Scholl published in 1851 a volume of verses, *Denise*. He collaborated in many dramas and showed his clever and piquant wit at its best in *L'esprit du boulevard* (1883) and *L'amour appris sans maître* (1891).

SCHÖLL, shĕl, MAXIMILIAN SAMSON FRIEDRICH (1766-1833). A German historian and diplomat, born at Harskirchen, in Nassau-Saarbrücken. Having embraced the principles of the French Revolution, he for a time held office in Strassburg, but was compelled to flee to Germany. Subsequently he held various diplomatic positions in the Prussian service, and he accompanied Hardenberg to the congresses of Vienna, Aix-la-Chapelle, Teplitz, Troppau, Laibach, and Verona. His many published works include: *Histoire de la littérature romaine* (1815); *Recueil de pièces officielles destinées à détromper les français sur les événements qui se sont passés depuis quelques années* (1814-16); *Recueil des pièces relatives au congrès de Vienne* (1816-18); a continuation of Koch's *Histoire abrégée des traités de paix*, etc. (1817-18); *Archives historiques et politiques* (1818-19); *Tableau des révolutions de l'Europe* (1823); and *Cours d'histoire des états européens depuis le bouleversement de l'empire romain jusqu'en 1789* (1830-33), his most elaborate work.

SCHOLTEN, skôl'ten, JAN HENDRIK (1811-85). A Dutch theologian. He was born at Vleuter, near Utrecht, studied at Utrecht, and was minister at Meerkerk (1838-40). He was professor of theology at the Athenæum of Franeker, 1840-43, and in the University of Leyden, 1843-81. Scholten was the head of the critical school of theology in Holland, and in some of his views approached the position of the Tübingen school of Germany. He published many works, the greater number dealing with questions of New Testament criticism or theology. Most of them are accessible in French or German translations. He summed up his teaching in his farewell address, *Afschiedsrede* (1881). Consult Kuenen, *Levensbericht van I. Henricus Scholten* (Amsterdam, 1875).

SCHOLZ, shôlts, BERNHARD (1835—). A German composer, born at Mainz. He studied the piano with Ernst Pauer and theory with S. W. Dehn. In 1856 he was appointed teacher of theory at the Royal School of Music in Munich, and from 1859 to 1865 was kapellmeister at the Court Theatre in Hanover. In 1883 he succeeded Raff as director of the Hoch Conservatory at Frankfort. Besides the operas *Carlo Rosa* (1858), *Morgiane* (1870), *Der Trompeter von Säckingen* (1877), and *Ingo* (1898), he composed a requiem, cantatas, a symphony, a string quintet, and other chamber music, choral works, and songs. His best-known work is his setting of Schiller's *Lied von der Glocke*, for solo, chorus, and orchestra.

SCHÖMANN, shĕ'mán, GEORG FRIEDRICH (1793-1879). A German philologist and archæologist. He was born at Stralsund, and after studying at Greifswald and Jena was professor of classical literature at the former university from about 1826 till his death. His works, which refer chiefly to Greek law and literature, are distinguished by their profundity and clearness. Among the most important are: *Der attische Prozess* (with Meier, 1824, reëdited by Lepsius, 1883-87); *Griechische Altertümer* (1850-59; Eng. trans. by Hardy and Mann, 1880); several grammatical works and critical editions of Isæus (with translation, 1831); Plutarch's *Agis et Cleomenes* (1839); Æschylus's *Prometheus* (1844); Cicero's *De Natura Deorum* (1850); and Hesiod's *Theogony* (1868). Selections from his minor works on Greek history, mythology, and archæology were published in his *Opuscula Academica* (1856-57).

SCHOMBERG, shôm'bĕrk, FREDERICK HERMANN, Duke of (1615-90). A German soldier of fortune, born at Heidelberg. He served in the army of the United Provinces and in the French army. During the War of Liberation in Portugal he held important commands and finally succeeded in compelling Spain to recognize the independence of that country (1668). In 1675, again serving with the French army in Catalonia, he won the grade of marshal. He left France in 1685, and after serving a short time with the Elector of Brandenburg was appointed by the Prince of Orange his second in command in the English expedition of 1688. Afterwards (1689) he received the title of Duke of Schomberg in the English peerage, was made a Knight of the Garter, and also master of the ordnance, besides receiving a grant of £100,000 from Parliament. In the expedition against Ireland he took a prominent part, but was killed at the battle of the Boyne.

SCHOMBURGK, shōm'bōōrk, Sir ROBERT HERMANN (1804-65). A traveler and explorer, born at Freiburg, in Prussian Saxony. He emigrated to the United States in 1829, and the next year removed to Anegada, one of the British West India islands, which he thoroughly explored. In 1835 the Royal Geographical Society sent him on a scientific expedition to British Guiana, where he explored a vast tract of territory previously almost unknown. In 1840 he was sent to Guiana, where he spent another four years exploring the Hinterland and surveying the boundaries of the colony. The so-called 'Schomburgk line' played an important part in the controversy between Great Britain and Venezuela. (See VENEZUELA.) In 1844 he was knighted. Four years later he was appointed British consul at Santo Domingo, and in 1857 he was promoted to be Consul-General at Bangkok. His published

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works include: *Description of British Guiana, Geographical and Statistical* (1840); *Twelve Views in the Interior of Guiana* (1840); *History of Barbadoes* (1847). His most famous botanical discovery was that of the *Victoria* (q.v.) *regia*.

SCHÖN, shĕn, HEINRICH THEODOR VON (1773-1856). A Prussian statesman, born in Lithuania. He studied law and political science at Königsberg. In 1793 he entered the Government service and was rapidly promoted, serving as Governor. After the Peace of Tilsit he rendered great assistance in carrying out the reforms of Stein and Hardenberg, and to him is attributed the authorship of the *Politisches Testament*, which Stein issued upon his retirement from office. In 1816 Schön was appointed Governor of West Prussia, and eight years afterwards of the whole Province of Prussia. Under his administration many reforms were made. He was an ardent liberal, and it was partly through his efforts that upon the accession of the new King in 1840 a demand was made for a constitution. Schön was made Minister of State, but his ideas were too advanced for Frederick William IV., and he found it expedient in 1842 to retire from political life. His memoirs and correspondence were published by his son under the title of *Aus den Papieren des Ministers und Burggrafen von Marienburg Theodor von Schön* (1875-83). Consult Seeley, *Life and Times of Stein* (Cambridge, 1878).

SCHÖNBACH, shĕn'bäk, ANTON (1848—). An Austrian Germanic philologist, born at Rumburg, Bohemia. After studying in Vienna and under Scherer and Müllenhoff, in Berlin, he began to lecture at Vienna in 1872, and was appointed professor at the University of Graz in 1873. Besides valuable editions of Old-German sacred poetry and prose, such as *Ueber die Marienklagen* (1874), *Altdeutsche Predigten* (1886-91), *Auslese altdeutscher Segensformeln* (1893), he published *Beiträge zur Charakteristik Hawthornes* (1884); *Walther von der Vogelweide* (2d ed., 1895); *Ueber Hartmann von Aue* (1894); *Das Christentum in der altdeutschen Heldendichtung* (1897); *Gesammelte Aufsätze zur neueren Litteratur in Deutschland, Oesterreich, Amerika* (1900); *Studien zur Erzählungslitteratur des Mittelalters* (1898-1902); and *Ueber Lesen und Bildung* (6th ed., 1900), which met with great approbation. Conjointly with Bernhard Seuffert he edits the *Grazer Studien zur deutschen Philologie* (Graz, 1895 et seq.).

SCHÖNBEIN, shĕn'bīn, CHRISTIAN FRIEDRICH (1799-1868). A German chemist, born at Metzingen, Württemberg. He studied natural science at Tübingen and Erlangen and became professor at Basel in 1828. In 1839 he discovered ozone and in 1845 invented guncotton, from which, by dissolution in a mixture of alcohol and ether, he obtained the material called collodion, which soon found application in surgery. His works include: *Das Verhalten des Eisens zum Sauerstoff* (1837); *Beiträge zur physikalischen Chemie* (1844); *Ueber die Erzeugung des Ozons* (1844); *Ueber die langsame und rasche Verbrennung der Körper in atmosphärischer Luft* (1845). For his biography, consult Hagenbach (Basel, 1868) and Kahlbaum and Schaer (Leipzig, 1901).

SCHÖNBERG, shĕn'bĕrk, or MÄHRISCH-SCHÖNBERG. A town of the Province of Moravia, Austria, on the River Tess, 159 miles by rail east-southeast from Prague (Map: Austria, E 2). It lies in a charming valley, has a handsome church, and a weaving and agricultural school. It is an industrial centre, with large manufactures of textiles. Population, in 1900, 11,636, mostly Germans.

SCHÖNBERG, GUSTAV VON (1839—). A German economist, born in Stettin and educated in Bonn and Berlin. In 1869 he went to Basel, in 1870 to Freiburg, and in 1873, as professor of political economy, to Tübingen, where in 1899 he was appointed chancellor of the university. Among his works are: *Zur wirtschaftlichen Bedeutung des deutschen Zunftwesens im Mittelalter* (1868); *Die Volkswirtschaft der Gegenwart* (1869); *Die Frauenfrage* (1873); *Die sittlich-religiöse Bedeutung der sozialen Frage* (2d ed. 1876); *Zur Handwerkerfrage* (1876); *Socialpolitik des Deutschen Reichs* (1886); and *Volkswirtschaftliche Abhandlungen* (1886; 4th ed. 1898). He was one of the editors of a *Handbuch der politischen Oekonomie* (4th ed. 1896-98).

SCHÖNBRUNN, shĕn'brun. A famous palace in the outskirts of Vienna, the summer residence of the Imperial family (Map: Austria, B 5). Here the Treaty of Schönbrunn between Austria and France, following the victory of Napoleon at Wagram, was signed on October 14, 1809. Austria surrendered Salzburg, part of Upper Austria, and Carinthia, Carniola, most of Croatia, the Adriatic coast-land, and the territory which she had taken in the third partition of Poland (1795).

SCHÖNEBECK, shē'ne-bĕk. A town in the Province of Saxony, Prussia, on the Elbe, 8 miles south-southeast of Magdeburg (Map: Prussia, D 2). It has important chemical works and salt refineries. It also manufactures matches, colors, buttons, machinery, artificial guano, etc. There is a trade in grain, timber, and coal. Population, in 1900, 16,257.

SCHÖNEBERG, shē'ne-bĕrk. A residential suburb of Berlin (q.v.). It is the seat of an aërial navigation bureau of the German army, and has an observatory and a large private insane asylum. The manufactures include sulphite-cellulose, photographic apparatus, paper, lightning-rods, and military supplies. There is also a large railway repair and construction shop. Population, in 1900, 96,059.

SCHÖNEFELD, shē'ne-fĕlt, HENRY (1856—). An American composer and pianist, born in Milwaukee, Wis. In 1874 he went to Leipzig for study. He returned to America in 1879, and settled in Chicago, where he conducted several musical societies, and was on the faculty of the Hershey School of Music. He was one of the first American-born composers to use negro folk-songs. He became a member of both the Chicago and the New York Manuscript Society. His compositions include *Gypsy Melodies, Liberty, In the Sunny South, Rural Symphony, Reverie, Serenade, Valse Brilliante*, and *Kleine Tanz Suite*.

SCHÖNEMANN, shē'ne-mân, ANNA ELISABETH (1758-1817). A friend of Goethe, born in Frankfort-on-the-Main. She was the daughter of a wealthy merchant, was betrothed to Goethe in the spring of 1775 and inspired his poems to "Lili." The engagement was soon broken, and in August she married Baron von Türckheim, who

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later became Mayor of Strassburg. Consult Von Dürckheim, *Lillis Bild* (2d ed., Munich, 1894).

SCHONGAUER, shōn'gou-ēr, MARTIN (c.1440-91). A painter and engraver of the early Suabian school, the greatest German artist of the fifteenth century. He was commonly called Martin Schön or Hübsch Martin, by reason of his beautiful art. He was born at Kolmar, Alsace, the son of Kaspar Schongauer, a goldsmith of Augsburg, who had settled at Kolmar before 1440. Martin probably practiced at first his father's craft, and, turning to painting at an early period, was presumably instructed by Kaspar Isenmann, then the most prominent painter of Kolmar, whose influence is traceable in Schongauer's work. Whether he afterwards studied under Rogier van der Weyden is open to doubt, but he surely passed an apprenticeship in the Netherlands and was deeply impressed by the works of Rogier, emancipating himself only gradually from their influence. After his return he established at Kolmar a studio for painting and engraving, frequented by numerous disciples and assistants. While engaged upon a commission at Breisach, he died on February 2, 1491.

The number of Schongauer's authenticated paintings is very limited, and his artistic development can therefore be more easily estimated from his engravings. His early period is best represented by the "Madonna in an Arbor of Roses" (1473), now in the Schongauer Museum at Kolmar, a highly finished work, in which the Flemish type is unmistakable. Of later date is, in the same museum, the series of sixteen panels, depicting the "Passion of Christ," in which native German influences preponderate. A similar progress may be observed in the two altar wings with the "Annunciation" and the "Child Adored by the Virgin and Saint Anthony." His latest stage is well exemplified by two exquisite small pictures of the "Holy Family," in the Pinakothek at Munich and the Vienna Museum.

As an engraver, Schongauer ranks as the foremost artist of his day. His modeling and shading are firm and delicate, the compositions highly picturesque, and the landscape backgrounds exceed anything previously achieved in German art. Among his 117 plates some of the most remarkable are the "Bearing of the Cross," "The Annunciation," "Christ on the Cross," "The Wise and Foolish Virgins," "The Temptation of Saint Anthony," "Christ Enthroned," and the ideal figure of "Saint Agnes." The most comprehensive reproduction of his engravings is Amand-Durand, *Œuvre de Martin Schongauer*, with text by Duplessis (Paris, 1881). Consult: Schmidt, in Dohme, *Kunst und Künstler* (Leipzig, 1877); Bach, "Neues über Martin Schongauer," in *Reportorium für Kunstwissenschaft*, xxii. (Berlin, 1899); Goutzwiller, *Le musée de Colmar* (Paris, 1875); Burckhardt, *Die Schule Martin Schongauers am Oberrhein* (Basel, 1888); and Janitschek, *Geschichte der deutschen Malerei* (Berlin, 1890).

SCHÖNLEBER, shēn'lā-bēr, GUSTAV (1851—). A German landscape painter, born in Bietigheim, Württemberg. He studied in Stuttgart and Munich. In 1880 he was called to the Academy of Karlsruhe, of which institution he afterwards became director. Among his principal paintings may be mentioned: "Port of Rotterdam" (1879); "Quinto al mare" (1888); "Castello di Paraggi" (1893); "Summer Storm at Rapallo" (1898); and numerous other coast scenes in Italy, Holland, and England, besides village views in Germany. As a colorist Schönleber is subdued, preferring the lights of storm and mist. In drawing he has the precision of the Renaissance allied to the most modern composition. He is known also as an etcher and illustrator.

SCHÖNLEIN, shēn'līn, JOHANN LUKAS (1793-1864). A German professor of medicine, born in Bamberg. He studied medicine at Landshut, Jena, Göttingen, and Würzburg. After teaching at Würzburg and Zurich he was called to Berlin in 1839. There he taught therapeutics and pathology and directed the clinical department in the university. He was also appointed physician to Frederick William IV. He wrote *Allgemeine und specielle Pathologie und Therapie* (1832) and *Klinische Vorträge im Charité Krankenhause zu Berlin* (1842). Consult Virchow, *Gedächtnisrede auf Schönlein* (Berlin, 1865).

SCHÖNN, shēn, ALOIS (1826-97). An Austrian genre painter, born in Vienna and educated in the academy of that city. In 1848 he enlisted as a sharpshooter in a Tyrolese regiment and saw service in Italy. There and afterwards in Hungary he gained material for his first pictures. In 1850-51 Schönn studied under Horace Vernet in Paris. He then traveled in the southern regions of Austria and the East, which gave him subjects for many of his best known canvases, such as "On the Coast of Genoa" (1872, Vienna Museum), Arab Story Tellers, Turkish Vintage Festival, etc. Gypsy life in Hungary was also one of his favorite subjects, as shown by "Village Gypsies in Upper Hungary" (Gotha Museum).

SCHÖNTHAN, shēn'tān, FRANZ VON (1849—). An Austrian dramatist, born in Vienna. After serving four years in the navy he went on the stage and also began to write for periodicals. His first successful dramatic effort was *Das Mädchen aus der Fremde* (1879), upon which followed the farce *Sodom and Gomorrha* (1880), and, in collaboration with Moser, *Der Zugvogel* and *Krieg und Frieden*, played on all the stages of Germany. In 1883-84 stage manager of the Stadtheater in Vienna, he lived afterwards alternately in Berlin and on his estate at Brunn, near Vienna, and finally settled at Dresden. Of his numerous comedies, often partaking of a farcical character, may be mentioned: *Unsre Frauen* (with Moser, 1881); *Der Schwabenstreich* (1882); with his brother Paul: *Der Raub der Sabinerinnen*, *Frau Direktor Striese* (1885), and *Das gelobte Land* (1892); with Kadelburg: *Goldfische* (1886), *Die berühmte Frau* (1887), *Der Herr Senator* (1894); and with Kopell-Ellfeld: *Komtesse Guckerl* (1895), *Renaissance*, *Die goldene Eva* (1896), and *Florio und Flavio* (1901). Several of his plays are well known on the American stage.

His brother PAUL (1853—), after serving in the army, became a journalist in Vienna, and published numerous tales and novels, notably: *Welt- und Kleinstadtgeschichten* (1889); *Ringstrassenzauber* (1894); *Schlechte Rasse* (1894); *Geberden der Liebe* (1895); *Wiener Luft* (1897); *Enfant terrible* (1897); *Brave und schlimme Frauen* (1901); and *Pariser Modell* (1902), a

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novel. Also *Die elegante Welt. Handbuch der vornehmen Lebensart* (6th ed. 1895).

SCHOODIC, skōō'dĭk. A river of Maine. See SAINT CROIX.

SCHOOLCRAFT, HENRY ROWE (1793-1864). An American ethnologist. He was born in Watervliet (now Guilderland), New York. He studied mineralogy and chemistry for a year in Union College, and in 1817 began the publication of a work on *Vitreology*. In 1817-18 he made a tour of the West, especially through southern Missouri and Arkansas, to study mineralogy and geology. The result was a volume entitled *A View of the Lead Mines of Missouri*. In the following year he received an appointment from the Government to explore the Upper Mississippi and the copper regions of Lake Superior. In 1822 he was made agent for the tribes about Lake Superior, and thenceforth turned his attention to history and ethnology. In 1831 he was one of the principal founders of the Algic Society, in Detroit, devoted to the antiquities and ethnology of the American aborigines. In 1836 he was instrumental in settling land disputes with the Chippewas, and by the treaties then effected the United States became possessed of vast territory, worth many millions of dollars. It was while he was engaged as Superintendent of Indian Affairs in this Northern Department that he published his *Algic Researches* (1839). From this period Schoolcraft gave his attention to literary pursuits. His chief contribution to the history of Indian affairs was his six quarto volumes entitled *Historical and Statistical Information Respecting the History, Condition, and Prospects of the Indian Tribes of the United States* (1851-57). The work is partly from his pen and partly a collection of essays of greater or less value by others. Among his other publications the most important are: *Onéota; or the Red Race of America* (1844); *Notes on the Iroquois* (1846); *Personal Memoirs of a Residence of Thirty Years with the Indian Tribes on the American Frontiers* (1863).

SCHOOL DISEASES. See HYGIENE.

SCHOOL FOR SCANDAL, THE. A very popular comedy by Richard Brinsley Sheridan, produced in 1777. Much of the action centres in the devotees of scandal who meet at Lady Sneerwell's house to destroy reputations. Sir Peter and Lady Teazle, Maria, the ward, and the Surfaces, Charles, Joseph, and Sir Oliver, supply the comic situations, notably the auction scene, in which Charles sells the family portraits, and the screen scene, when Lady Teazle is surprised in Joseph's apartments by Sir Peter and Charles.

SCHOOLMASTER. A term sometimes applied in the United States and England to persons engaged in carrying on elementary and secondary instruction. In the great public schools of England from the beginning schoolmasters have been chosen usually with considerable care. Most of the charters of the great public schools provided for the election of headmasters from among the Masters of Art of either Oxford or Cambridge University. In the private and charitable schools, before the passage of the Educational Act of 1868, positions of schoolmasters were not infrequently filled by disappointed soldiers of fortune, who were mostly ignorant of even the elementary subjects which they were intended to teach. With the establishment of training colleges for teachers, and the assumption of the responsibility of supervision of education in the latter half of the nineteenth century by the English Government, educational matters took a turn for the better, and the condition of the schoolmaster has since been gradually improving.

In the United States the same marked development in the status of the schoolmaster may be noticed as in England. In colonial times there were no trained teachers. Whoever chose to set himself up as schoolmaster was allowed to do so without regard to his previous training or attainments. There was no inducement for able young men to enter the teaching profession. Salaries were low, and the status of a schoolmaster was correspondingly insignificant, and only with the educational awakening of the Horace Mann period begins the rise of teaching as a profession. At common law the authority of the schoolmaster over his pupils was that of one *in loco parentis*, and where unmodified by statute this rule still persists.

SCHOOLMASTER, THE. A work on education by Roger Ascham (1570), which gives his methods of learning Latin and of training children.

SCHOOLMEN. See SCHOLASTICISM.

SCHOOL OF ATHENS. See RAPHAEL.

SCHOOLS (AS. *scōlu*, from Lat. *scola, schola*, learned discussion, lecture, school, from Gk. σχολή, *scholē*, learning, leisure, school). Places where instruction is given.

The elementary instruction of the Hindu Brahman is given either out of doors or in some rude building. Instruction is to a large extent oral. The Brahman repeats certain passages which the pupils are expected to learn to recite verbatim. Writing is first practiced in sand. The more advanced grades of Hindu instruction involve extensive reading. In China each pupil provides his writing table and chair, his books and writing materials. The school hours are from sunrise till 5 P.M., with an intermission of an hour from 10 A.M. to 11 A.M. The children learn to pronounce the characters in their books by imitating their teacher. Reading matter is committed to memory by repeating it aloud. As the written language differs from the spoken one, these exercises are like learning to pronounce and read the characters of a foreign tongue without understanding their significance. Later on exercises in translation and composition appear. Among the Hebrews the Law was expounded by teachers in the porches of the Temple. The synagogues were used for a similar purpose, and in them children were instructed during the week. The amount of instruction grew until, from being merely an oral teaching of the law, it involved letters and arithmetic. Elementary schools became common after the Christian Era, and in A.D. 64 they were made obligatory by the High Priest Joshua ben Gamala. The Spartan education was chiefly physical, consisting of athletic exercises and dancing, frequently accompanied by chanting. It was conducted in the open air under the guidance of officers called παιδονόμοι. Each youth was also under the special charge of an adult, whose office was to inspire him to exert his best powers. At Athens the schools were probably all conducted as private ventures. Some were situated in the open air or in the porticoes of temples. There were two classes of schools for

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boys. One, the musical or literary school, was taught by a grammatist. Instruction in the non-literary phases of music was often given by a citharist. The other school, the palæstra or gymnastic school for boys, was under the *pædotribe*. In the literary school the curriculum included reading, writing, arithmetic, and in some cases drawing and geography. The poets, especially Homer, were for the most part the authors read. Arithmetic was very simple, being that necessary for ordinary business. The abacus was used. In writing, younger pupils employed the wax tablet and the stylus, older ones, pen and ink, with papyrus. Maps are known to have been in use. Older students attended a gymnasium, where the instruction was more of a professional character. Younger boys were accompanied to school by a pedagogue (παιδαγωγός), to whom was intrusted the general oversight of the conduct and welfare of his charge. The pedagogue was usually a slave. The hours of daylight were all consumed at school.

At Rome primary instruction was given in the *ludus*. Reading and writing were here taught, and sometimes arithmetic. Frequently, however, a special teacher of arithmetic was employed. Pebbles (calculi) were used in figuring, and the stylus and wax tablet in writing. The books were rolls of manuscript carried in wooden boxes. The schools were conducted as private ventures and were sometimes held in the open air. Usually, however, they were in mean and sparsely furnished apartments. The children sat on the floor. The work was largely that of committing to memory, and discipline was severe, flogging being a common resort. The pedagogue existed as in Greece. At about 12 years of age the boy passed into a secondary school, that of the *grammaticus*. Here he was taught grammar, Greek, and a little geography and geometry. The quarters were usually somewhat better than those of the *ludus*. Children sat on benches, while the master occupied a raised seat or cathedra. In later times some of these schoolrooms were adorned with works of art. The elementary teacher among both Romans and Greeks was held in low esteem, if not in positive contempt.

During the Middle Ages elementary schools existed in connection with the monasteries, the cathedrals or collegiate churches, the hospitals, and the guilds. As the Church conceived education to be its function, wherever an association of the clergy existed some instruction was commonly carried on. Each monastery usually provided quarters and a schoolroom for its novices or *oblati*. In 817 the Council of Aix-la-Chapelle decreed that the *externi*, or pupils not preparing for holy orders, should be separated from the others. The instruction in the different monasteries was of widely varying merit. It began with exercises in reading the Latin psalter, little if any attention being paid to its meaning. At the same time there was practice in copying on wax tablets. The pupils were trained to sing the church services, and a little instruction in arithmetic and Latin was given. Secondary instruction comprised the *trivium* (q.v.) and the *quadrivium* (q.v.) constituted the higher education. The schoolrooms, methods, and discipline were in harmony with the ascetic spirit of the time. Shortly after the beginning of the 'trivial' studies, boys not destined for the Church were usually withdrawn from the school. More advanced novices were set to teach lower classes. A considerable number of the pupils in the monastic and hospital schools were charitably cared for, and in many institutions no great pains were taken with their instruction, except to render them effective in performing the church services. In general, however, instruction was free, those having means providing for their own maintenance. The guild schools, taught ordinarily by the chaplain of the guild, gave a little instruction in Latin, such as would be required in business, where accounts and correspondence were to a considerable extent in that language. More stress was laid in these schools on arithmetic, and in Germany one guild, the *Rechenmeister*, developed this subject extensively.

The appearance of printed books gave a powerful impetus to learning, and the Renaissance introduced new motives into elementary and especially secondary education. Power to appreciate the beauty of literature and skill in literary composition, such as poetry and letter-writing, became objects of desire on the part of the aristocratic classes in society. A class of lay teachers sprang into existence to satisfy the demand. Private schools became a source of considerable income and social prestige to their masters, and tutorial education assumed unprecedented importance. A variety of methods and subjects were introduced or proposed for enlivening the school atmosphere. In the secondary schools the Jesuits developed to a marked extent schemes by which the interest of emulation might be invoked. History became a prominent subject, and great stress was laid on the classics as literature. Declamation, the acting of plays, poetic composition, etc., appear everywhere as school exercises. Study of the vernacular is gradually introduced, and later a mastery of French becomes indispensable in the diplomat and practically so in the cultivated man. The educational critics and reformers of the period and the sixteenth and seventeenth centuries urge the need of making the school more interesting by mitigating the severity of the discipline, especially as regarded corporal punishment, by increasing the attractiveness of the schoolrooms, by introducing gymnastic exercises, study of the world of nature at first hand, and illustrated textbooks. Rabelais, Montaigne, Comenius (q.v.), and Locke represent the advanced thought of the time. A prevalent custom was to send youths traveling accompanied by a tutor. Even before the Renaissance the custom of wandering from monastery to monastery existed. The development of universities increased the practice of traveling. Frequently students without means begged their way.

In the seventeenth and eighteenth centuries there flourished in Germany the *Ritteracademien*, or academies for nobles. They were usually situated in the capital city of a principality, and the students participated in the social life of the Court. Stress was laid on the study of French, and drawing and fencing masters were employed. In the English public school life of the period athletic exercises came to take the prominent part they have since maintained.

The Renaissance, by expanding enormously the trivium or secondary school curriculum, led to elaborate systems of grading of students. The Brethren of the Christian Schools, an Order founded by La Salle in 1683, employed for the first time in elementary instruction the system of

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grading, and instruction was given to classes instead of individuals. Before the eighteenth century manual training had appeared in the schools. The institutions founded by Francke at Halle included Burgher schools and a *Pedagogium*, in both of which students were trained in the manual arts. These schools also offer examples of the study of natural science by laboratory methods.

The complex and rapid development of modern schools is best studied under the titles given at the end of this article.

RELIGIOUS EDUCATION IN SCHOOLS. The history of religious education has been bound up with that of the control of education by priesthoods or churches. Inasmuch as the civic virtues of the people are cultivated and sanctioned by religious observances and beliefs, religious education has been of the greatest importance in developing cohesive and powerful nationalities. This is especially true while the religion remains a purely national one. With the appearance of cosmopolitan religions like Christianity and Mohammedanism, the value of religious education for the cultivation of a specifically national spirit became less. In Europe Church and State drifted apart, and the former, as dealing with man's spiritual interests, assumed control of education. The Reformation, by introducing nationalism again into matters of religion, led to the active assumption by Protestant rulers of authority over education, as one of the phases of religious responsibility. In the struggles that followed, religious education was felt to be a means, not merely of furthering man's eternal and spiritual welfare, but also of strengthening the State. The multiplication of sects, however, leading in many communities to a separation of Church from State, has tended to drive out from the State schools such religious instruction as is peculiar to any specific Church, and to exclude or minimize the amount of ecclesiastical control or inspection. The Catholics maintain schools of all grades in the United States, England, and the Catholic nations of Europe. In France up to the time of the enforcement of the Associations Law a considerable fraction of both elementary and secondary education was carried on by different Catholic Orders. In these schools religious instruction constitutes an important part of the curricula. See FRANCE, section on *Education*.

In respect to religious instruction and the supervision thereof, the following classes of schools exist:

(1) Schools conducted under denominational auspices and subsidized by the State. England, Holland, and Russia furnish examples of this type. In Russia the schools of the Holy Synod carry on nearly half of the elementary instruction given. Their principal aim is religious education, and their maintenance is entirely from public funds. In England the schools of the Church societies have been for many years in receipt of Government grants. In return, however, they have submitted to Government inspection and are not allowed to require any specific faith of their pupils. Moreover, the 'conscience clause' allows parents, if they see fit, to withdraw children from school during the time devoted to religious exercises. The law of 1902 places the programme of secular studies in such schools in the hands of the Government, which in return provides almost entirely for their maintenance. In Holland denominational schools are subsidized, provided they maintain the official standard.

(2) Schools under State control, but offering religious instruction that is supervised by religious authorities. In Spain religious instruction is given regularly in the State schools, and the clergy are represented on the governing boards and inspect the schools. In Austria religious instruction is given in the schools. The beliefs of the religion dominant in the locality are taught. The instruction is usually carried on by clergymen. In Prussia religious instruction is compulsory and supervised by the clergy. The tenets of the majority are taught by regular teachers. The State also provides partially for the religious instruction of the minority. In Sweden the clergy inspect the schools and are prominent in their control. In Norway religious instruction is supervised by the clergy. The same is true of Denmark.

(3) In several countries, while the school does not undertake religious instruction, the State permits the use of the schoolhouse for this purpose, and sometimes sets aside a period during which such instruction may be given by the clergy of different denominations. Such a plan exists in Holland and in some of the cantons of Switzerland. In France place is made on the school programme for the attendance of children on religious instruction, but it is given outside the school building. In Italy religious instruction may be given outside the schoolhouse if there is a local demand therefor.

(4) Many countries exclude denominational religious instruction entirely from the curriculum. France his taken this stand, but the French school programme contains a great deal of instruction of an ethical and religious but non-denominational character. The Swiss Constitution forbids compulsory religious instruction and some cantons give none whatever. The religious instruction of the English non-denominational public schools is of a very general character, and the conscience clause permits the withdrawal of pupils from it. In the United States no denominational instruction is given in the schools of any State. In New England Bible reading and prayer are a common part of the programme of school work. Massachusetts requires them, but children may be withdrawn while religious exercises are being conducted, if the parents so desire. In many of the States the constitutions forbid the use of public funds for the aid of sectarian schools. Many also forbid sectarian instruction in the schools. This, however, is not taken to mean that the Bible should not be read or prayer offered, for in 1895 the Bureau of Education found that out of 808 cities of 4000 population or over, which were scattered over the Union, 651 had religious exercises in their schools, and these were prohibited in only 77 cities. In Wisconsin the prohibition of religious exercises is general.

The earlier colonial schools of the United States were usually under sectarian control and gave much attention to religious instruction. After the Revolution the spirit of freedom in religious matters became dominant. The First Amendment to the Constitution declares that "Congress shall make no law respecting an establishment of religion or prohibiting the free exercise thereof." The States also have followed the

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spirit of this provision. The lack of specific religious instruction in the public schools has, however, been felt by many to be a serious defect. The Catholics, while agreeing and even insisting that the public school should be non-sectarian, have urged that their own parochial schools should be subsidized out of the public funds to which they have contributed. In New Mexico and Georgia they have succeeded in getting such appropriations. There has also been a general feeling that the knowledge of the Bible even as a work of literature was fast disappearing. The Sunday school, to which the churches have resorted for the religious instruction of the young, is felt to be inadequate and to fail in reaching a large portion of the population.

The relation between the schools and the State is discussed under the headings EDUCATION and NATIONAL EDUCATION, SYSTEMS OF. The development of the school system in the United States is also treated under PUBLIC SCHOOLS. The local and general administration of schools and their relation to the Government in respect to State support and State control is taken up in still greater detail in the articles on the various countries of the world, under the heading EDUCATION. See also the articles: COMMON SCHOOLS; EVENING SCHOOLS; GRAMMAR SCHOOLS; HIGH SCHOOLS; PUBLIC SCHOOLS; SECONDARY SCHOOLS; SUMMER SCHOOLS; with bibliography under these headings.

SCHOOLS, BROTHERS OF THE CHRISTIAN. A religious congregation in the Roman Catholic Church, established for the education of the poor by Jean Baptiste de la Salle (q.v.) in 1684, and confirmed by the Pope in 1724. Their system of education has received the highest testimonies, and they still form one of the most flourishing of the lay Orders in the Roman Catholic Church. Besides this Order, several other institutes have been formed for the same purpose under similar names. An Irish institute of Christian Brothers was formed at Waterford in 1802, by a layman, Edmund Ignatius Rice (1762-1844), and confirmed by Pius VII. in 1820. In 1896 they reported 97 houses in Ireland, with 300 schools, and 30,000 pupils, as well as branches in Newfoundland, Gibraltar, Calcutta, and Allahabad.

SCHOOL SAVINGS BANKS. A system of banks by which school children may be encouraged in habits of thrift. In nearly all European countries school children are encouraged to acquire the habit of saving through the device of savings banks maintained in connection with the schools. Commonly these institutions are associated in management and in the official reports with the postal savings banks. They have not been extensively introduced into the United States, partly, no doubt, because of the willingness of the ordinary savings banks (q.v.) to receive small deposits, and partly because in recent years the penny provident banks have fully met the demand for such a means of encouraging saving by children.

SCHOOL-SHIP, NAUTICAL. See NAVAL SCHOOLS OF INSTRUCTION.

SCHOOLS OF LIBRARY ECONOMY. A term applied to institutions for the study of library administration. The movement to establish schools for the professional training of librarians began at Columbia University in 1883. In 1887 a three months' course was organized, and in 1889 the school was transferred to the New York State Library at Albany. The remarkable success of this school encouraged the establishment of similar institutions elsewhere, and in 1890 the Pratt Institute in Brooklyn, the Drexel Institute in Philadelphia, and the Armour, in Chicago, organized regular schools for this branch of study. In many universities courses in library economics are offered under the direction of their librarians. See LIBRARIES, section on *Library Schools and Training;* also PROFESSIONAL EDUCATION.

SCHOONER (from *scoon, scun,* to skim, skip, from Norweg. *skunna,* Icel. *skunda, skynda,* AS. *scyndan,* to hasten, OHG. *scuntan,* to urge on). A sailing vessel having two or more masts and wholly or chiefly fore-and-aft rigged. It is said to have been first designed by Captain Andrew Robinson, of Gloucester, Mass., in 1713. A few schooners have a topsail and a topgallantsail on the foremast, and are called 'topsail schooners.' Some schooners carry a single yard on the foremast on which to set a square sail when desirable. But by far the greater number are wholly fore-and-aft rigged. The lower sails are bent to gaffs, booms, and hoops on the mast. There are usually two masts, but sometimes as many as seven. The schooner rig is distinctively American; its use abroad, until recently, was confined to quite small craft. See SAIL; YACHT, and accompanying Plate.

SCHOPENHAUER, shō'pen-hou'ĕr, ARTHUR (1788-1860). A German philosopher, born at Danzig, February 22, 1788. He was the son of a rich banker and merchant, who determined to educate him to be a man of affairs, and put him to school in France, and afterwards took him on travels through Belgium, England, France, and Switzerland. In 1805 he was placed in a business house in Hamburg, but soon afterwards, on his father's sudden death, he was taken by his mother to Weimar, where he entered upon the study of classics, natural science, and philosophy. In 1809 he entered the University of Göttingen, and devoted himself at first to medicine, but was soon attracted to philosophy, and in 1811 he went to Berlin to hear Fichte. In 1813 he took his degree at Jena on the since celebrated thesis: *Ueber die vierfache Wurzel des Satzes vom zureichenden Grunde.* In this treatise he distinguished between the principles of being, of becoming, of knowing, and of acting. These are respectively space and time, causality, logical ground, and motive. Schopenhauer spent the winter of 1813 at Weimar, where he enjoyed the society of Goethe, and devoted himself to studies in Oriental philosophy and in the theory of color. From 1814 to 1818 he lived at Dresden, occupied in writing a treatise on optics: *Ueber das Sehen und die Farben* (1816), and his magnum opus *Die Welt als Wille und Vorstellung* (1819). He then traveled in Italy, and returned to lecture in Berlin as privat-docent in 1820. Hegel was at that time the rage, and Schopenhauer found no success in lecturing against such a popular rival. After two years he returned to Italy, to stay three years more. But a renewal of philosophic interest recalled him in the south and he again attempted to establish himself as a lecturer in Berlin. In a spirit of bravado he chose for his own lectures the hours when Hegel was drawing his crowds, but failed to furnish a sufficient counter-attraction. In 1831 he left Berlin for

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good and settled in Frankfort-on-the-Main, where he spent many years in morose seclusion. He still worked in elaboration of his system, and published *Ueber den Willen in der Natur* (1836), *Die beiden Grundprobleme der Ethik* (1841), and *Parerga und Paralipomena* (1851).

The last few years of his life were made happy for him by the homage of his admirers, and by the calm which had come to his passionate nature with advancing years. He died in 1860, and the fame he had vainly longed for in life soon gathered around his memory. By temperament moody and despondent, irritable in temper, and violent in passions, he was well endowed to seize just those aspects of life which are the elements of a pessimistic philosophy. But the value of Schopenhauer's philosophy cannot be measured by any such method of personal criticism. His system, set forth in a literary form that, in the field of philosophy, has never been surpassed unless by Plato at his best, and based on marvellous insight into the realities of life, falling in also with the disappointed mood of the age, has gained an acceptance that is, perhaps, greater than its real value warrants. Yet it has an abiding worth as emphasizing elements which a too optimistic philosophy did not sufficiently consider. The profound tragedy of life, the very real evil of the world, which is so fundamental a part of all great philosophies and religions, is ever present in his thought, though without sufficient balance. In this his thought is akin to that of the ancient Hindu philosophies, with which he felt himself in close harmony, believing that he had accomplished a synthesis of their insight with Kantian thought. With him the tragedy of lifes arises from the very nature of the underlying source of all existence, which is will, not intelligence—will, not in the ordinary sense of choice, but in the sense of activity, energy, impulse. This is not rational, since impulse is prior to reason. In its caprice (essentially incapable of reasoned action), it makes reason to be. Thus it is not reason that goes out into realization of itself in the world of persons and things, but impulse, which happens to realize itself in intelligence. Reason, thus, can never understand its own profounder source, since it is more and other than reason—is essentially irrational. It may modify impulse, may by resignation deny the will-to-live. The supreme wisdom of life is, therefore, what it has been (with differences) to such mystics as Thomas à Kempis and Gautama—resignation. This conception of the source of all life in will came to Schopenhauer through clear insight into the very nature of consciousness as essentially impulsive. His metaphysics is thus empirical, based on experience, arrived at by induction. As such, it furnishes a ground of reconciliation for elements realistic and idealistic which were before separated, even for science and metaphysics. A clearer and still deeper insight into consciousness, based on a healthier temperament, a less violent nature, a more regular life, using Schopenhauer's method, may (as it has never been done before) comprehend reason and impulse as equally fundamental elements in consciousness, or as equal aspects of the one underlying source of all things. Only a brief word can be given to Schopenhauer's great influence on art. The restlessness of desire—longing, hoping, toiling—comes upon peace of a certain sort in artistic contemplation. This is the controlling thought in Wagner's music; and music more than aught else reveals will to us, man's inmost nature. Restless movement, flow of changing passions, and unaccountable yearnings can be uttered adequately by music alone of the arts; and it is for this reason that music has been called the supreme art.

His complete works were edited by Frauenstädt (Leipzig, 1873-74; 3d ed. 1891); by Grisebach (ib., 1891), and also by Warschauer (Berlin, 1891). Grisebach also published Schopenhauer's *Handschriftlicher Nachlass* (Leipzig, 1891-93). Many of his works have been translated into English. Of these may be mentioned *The Art of Literature* (New York, 1891); *Religion, a Dialogue, and Other Essays* (London, 1889); *Selected Essays* (ib., 1891); *Studies in Pessimism* (ib., 1891); *Two Essays: On the Fourfold Root of the Principle of Sufficient Reason; On the Will in Nature* (ib., 1889); *The Wisdom of Life* (New York, 1891); *Counsels and Maxims*, trans. by Saunders (ib., 1891); *The World as Will and Idea* (London, 1883). For his life, consult Wallace (London, 1890), Zimmern (ib., 1876), Gwinner (Leipzig, 1878), Kuno Fischer (Heidelberg, 1897), Grisebach (Berlin, 1897), and Volkeir (Stuttgart, 1900). For exposition and criticism of the various aspects of his philosophy, Caldwell, *Schopenhauer's System in Its Philosophical Significance* (New York, 1896); Colvin, *Schopenhauer's Doctrine of the Thing-in-itself* (Providence, 1897); Damm, *Schopenhauers Ethik* (Annaberg, 1898); Lehmann, *Schopenhauer* (Berlin, 1894); Lorenz, *Zur Entwickelungsgeschichte der Metaphysik Schopenhauers* (Leipzig, 1897); Mayer, *Schopenhauers Aesthetik* (Halle, 1897). See PESSIMISM; PHILOSOPHY.

SCHOPENHAUER, JOHANNA (1766-1838). A German author and mother of the philosopher Arthur Schopenhauer. She was born at Danzig. At the age of twenty-seven she married the banker Heinrich Schopenhauer, and during the lifetime of her husband she spent much time in travel. After his death she lived for a time in Weimar, where she gathered about her a brilliant circle of remarkable persons, among whom were Wieland and Goethe. Afterwards she lived in Bonn and then in Jena. She wrote novels and descriptions of travel. *Gabriele* (1819) is considered her best book. Her complete works were published at Leipzig in 1830-31 in twenty-four volumes.

SCHORLEMMER, shôr'lĕm-mĕr, CARL (1834-92). A German-English chemist, born at Darmstadt. He was educated at Darmstadt and at the University of Giessen. In 1859 he went to Owens College, Manchester, and there he was made assistant in chemistry in 1861, and professor of organic chemistry in 1874. His chief contribution to chemistry is in connection with the simplest compounds of organic chemistry, viz. the compounds containing only carbon and hydrogen. Schorlemmer was the first to demonstrate by experiment that no compounds which would have contradicted the structural theory are really capable of existence; and thus he cleared the way for the introduction of one of the most useful theories of modern science. His publications include: *A Manual of the Chemistry of Carbon Compounds, or Organic Chemistry* (German and English, 1874); a voluminous *Systematic Treatise on Chemistry* (written jointly with

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Sir Henry Roscoe; the first part of this work was published in 1877, but the work is still incomplete); *The Rise and Development of Organic Chemistry* (1879), an historical work of considerable value. Consult Roscoe's sketch of Schorlemmer in the *Proceedings of the Royal Society* (1829-93, 52 vii).

SCHORN, shôrn, KARL (1803-50). A German historical painter, born at Düsseldorf. He studied under Wach of Berlin and Cornelius of Munich, and first came into notice through the firm and brilliant color of his pictures "Mary Stuart and Rizzio," "Charles V. at San Yuste," and "Cromwell Before the Battle of Dunbar" (Königsberg Museum). He took part in frescoing the arcades of the Hofgarten in Munich, and designed cartoons for the side windows of the Regensburg Cathedral. His chief work was ordered by Frederick William IV. of Prussia, "The Anabaptist Prisoners Before Bishop Franz of Münster in 1536." In the National Gallery at Berlin are "Capuchin Friars and Wallenstein Soldiers at Cards" (1837), and "Pope Paul III. Before the Portrait of Luther" (1839); in the New Pinakothek, at Munich, "Knox Disputing with Soldiers," and the colossal "Deluge" (1845-60, finished by Piloty). Schorn was a professor in the Munich Academy after 1847.

SCHOTT, CHARLES ANTHONY (1826-1901). An American civil engineer, born in Mannheim, Baden. He was educated at the Polytechnic School at Karlsruhe, came to the United States in 1848, and became permanently attached to the computing division of the United States Coast and Geodetic Survey. In 1855 he was appointed to supervise the magnetic work of the survey, and became at the same time chief of the computing division, an office which he held until 1899. In 1899 he received the Wilde Prize and 4,000 francs from the Academy of France in recognition of his scientific writings, published in the documents of the Smithsonian Institution and the reports of the Coast and Geodetic Survey, which were considered the most important in the history of terrestrial magnetism. He was a member of the National Academy of Sciences and a founder of the Washington Academy of Sciences.

SCHOTT, shôt, WALTER (1861—). A German sculptor, born at Ilsenburg, in the Harz Mountains. First instructed by Dopmeyer at Hanover, he frequented the Berlin Academy in 1880-83 and developed especially under the influence of Reinhold Begas. Of several graceful mythological and genre figures, a group of "Charity" and a "Girl Bowling" are especially noteworthy. His statues include those of "Frederick William I.," in the White Room of the Royal Palace, Berlin, of "Albert the Bear," in the Sieges-Allée, Berlin, and the equestrian statue of "Emperor William I." at the Kaiserhaus in Golsar. A series of candelabra with groups of animated figures, in the garden of the New Palace at Potsdam, well exemplify his sterling decorative work. His numerous busts are of singularly spirited conception. He was awarded gold medals in Berlin, Dresden, Munich, Antwerp, Chicago, and Vienna.

SCHOTT, WILHELM (1807-89). A German Orientalist. He was born in Mainz, studied at Giessen, Halle, and Berlin, and in 1838 became instructor of Eastern Asiatic languages in the University of Berlin. He wrote many valuable works on the languages and literature of Asia and Finland; chief among them are *Vocabularium Sinicum* (1844), *Buddhismus in Hochasien und in China* (1844), *Indochinesische Sprache* (1856), *Chinesische Verskunst* (1857), *Finnische und esthnische Heldensagen* (1866), and *Zur Uigurenfrage* (1874-75).

SCHOTTISCHE (Ger. Scottish). A slow modern dance in ¾ time. Probably it was invented by Markowski, a well-known London teacher of dancing, and first danced in 1848. It is a round dance somewhat resembling the polka (q.v.).

SCHOULER, skōō'lēr, JAMES (1839—). An American historian, born at Arlington, Mass. He was graduated at Harvard in 1859, practiced law in Boston, joined the Union Army (1862-63), and resumed the practice of law, on which he lectured in Boston University (1884), and at the National Law School, Washington. He lectured also on American history in Johns Hopkins University after 1889. He wrote legal treatises on *The Law of Domestic Relations* (1870), *The Law of Bailments* (1880), *The Law of Personal Property* (1873-76), *The Law of Husband and Wife* (1882), *The Law of Executors and Administrators* (1883), and *The Law of Wills* (1887). To history he contributed a *Life of Thomas Jefferson* (1893), *Historical Briefs* (1896), *Constitutional Studies* (1896), and a *History of the United States Under the Constitution* (1880-98). The last is his most important work, and is in many respects the best history of the United States as a nation—that is, not including the colonial period. It is the fullest narrative stretching from 1783 to 1865, and, while emphasizing politics, does not neglect social matters. It is pro-Northern in tone, but thorough and judicious, its chief defects being those of manner rather than matter.

SCHOUTEN, skou'ten, WILLEM CORNELIS (c.1567-1625). A Dutch navigator, born at Hoorn and long in the employ of the Dutch East India Company. Engaged in 1615 by the merchant Isaac Le Maire to find a western route to the East Indies, he set sail with his patron from Tekel, discovered the strait known by the name of the latter, separating Staten Island from the main island of Tierra del Fuego, and was the first to round Cape Horn, which he named after his birthplace. Since that time the outer route around the extremity of the continent has been used by sailing vessels in preference to the inner passage through the Straits of Magellan. Arriving in India, Schouten reëntered the service of the East India Company. He died in Madagascar.

SCHOUWEN, skou'vĕn. One of the islands forming the Dutch Province of Zealand (q.v.).

SCHRADER, shrä'dĕr, EBERHARD (1836—). A German Orientalist, especially famed in Assyriology. He was born in Brunswick, studied at Göttingen under Ewald, and was successively appointed professor of theology at Zurich (1863), at Giessen (1870), and at Jena (1873), and in 1875 was called to the chair of Oriental languages in Berlin. He wrote: *Studien zur Kritik und Erklärung der biblischen Urgeschichte* (1863); *Die assyrisch-babylonischen Keilinschriften* (1872); *Die Keilinschriften und das Alte Testament* (1872; 2d ed. 1883); *Die Höllenfahrt der*

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Istar, text, version, and commentary (1874); and *Zur Frage nach dem Ursprung der altbabylonischen Kultur* (1884).

SCHRADER, JULIUS (1815-1900). A distinguished German historical painter, born in Berlin. He entered the academy of that city at the age of fourteen, and in 1837 he went to Düsseldorf to study under Schadow, whose pupil he remained until 1845. At Rome he painted his first picture of significance, "The Capitulation of Calais in 1347" (1847, National Gallery, Berlin). Then followed "Frederick the Great After the Battle of Kolin" (1849, Leipzig Museum), "Wallenstein and Seni" (1850), and "The Death of Leonardo da Vinci" (1851). By the last his reputation was assured and he was offered a professorship in the Academy at Berlin, of which he afterwards became associate and senator. Other well-known pictures are: "Consecration of the Church of Saint Sophia in Constantinople" (1853), fresco, New Museum, Berlin; "Parting of Charles I. from His Family" (1855), "Esther Before Ahasuerus" (1856), "Homage of Berlin and Cologne in 1415" (1874), all in National Gallery, Berlin. Schrader also executed mural paintings in the Chapel Royal, Berlin, as well as several portraits. His work is distinguished by its fine color, its masterly treatment of the nude, and its historic accuracy.

SCHRADER, OTTO (1855—). A German comparative philologist, born at Weimar, and educated at Jena and Leipzig. First a teacher in the gymnasium at Jena, he afterwards became professor in the university there. An authoritative writer on linguistic archæology, he is known by *Linguistisch-historische Forschungen zur Handelsgeschichte und Warenkunde* (1886), *Sprachvergleichung und Urgeschichte* (1883; 2d ed. 1890; Eng. trans., *Prehistoric Antiquities of the Aryan Peoples*), and his *Reallexikon der indogermanischen Altertumskunde* (1901).

SCHRADIECK, shrä'dĕk, HENRY (1846—). A German violinist, born at Hamburg. He studied with Léonard at Brussels, and with David at Leipzig. He taught at the Moscow Conservatory (1864-68) and later was concertmeister at Hamburg and at Leipzig. From 1883 to 1889 professor at the Cincinnati Conservatory, he went back to Germany to conduct the Hamburg Philharmonic Society. In 1894 he returned to America as professor at the National Conservatory and later occupied a similar position in Philadelphia. Among his works are *25 grosze Studien für Geige allein*, *Scale Studies*, *Technical Studies*, and *Guide to the Study of Chords*.

SCHRAUDOLPH, shrou'dŏlf, JOHANN VON (1808-79). A distinguished German religious painter, born at Oberstdorf. In 1825 he went to the Academy of Fine Arts in Munich, where he studied under Schlotthauer. There he was employed by Cornelius in frescoing the Glyptothek and by Hess in the decoration of the All-Saints Chapel in the Basilica of Saint Boniface. He designed windows for the Church of Saint Martin's at Landshut and for the Cathedral of Regensburg. In 1844 he received from King Ludwig I. of Bavaria the important commission of decorating the entire Cathedral of Speyer. The work occupied him nine years. Many altar pieces and easel pictures are also from his brush, among which may be mentioned a large "Ascension of Christ," "Esther Before Ahasuerus," and "Fishing in the Sea of Tiberias," all in the New Pinakothek, Munich. His work shows a depth and sincerity of sentiment reminiscent of the Pre-Raphaelites, although purely modern in treatment.

SCHRAUF, shrouf, ALBRECHT (1837-97). An Austrian mineralogist, born and educated in Vienna. He was assistant curator (1861-67), and until 1874 curator of the Royal Museum of Minerals, and then after eleven years as docent in the university became professor of mineralogy. He published *Atlas der Krystallformen* (1864-78), *Lehrbuch der physikalischen Mineralogie* (1866-68), *Physikalische Studien* (1867), *Handbuch der Edelsteinkunde* (1869), and *Mineralogische Beobachtungen* (1871-76).

SCHREIBER, shrī'bĕr, HEINRICH (c.1476). A German mathematician, supposed to have been born at Erfurt, but the place and date of his death are unknown. He wrote under the Greek name Grammateus, and by this he is generally known. He studied first at Cracow and wrote while there (1514) an *Algorismus Proportionum*. Soon after (1518) he went to Vienna, where he became a professor in the university. The lectures being discontinued (1521) on account of an epidemic, Schreiber returned to Nuremberg and Erfurt and published (1523) a work on arithmetic and algebra which he had completed (1518) in Vienna. It is from this work, a decided contribution to German elementary mathematics, that he is chiefly known. He used the symbols + and —, though not the first to do so, and was the first, so far as known, to teach bookkeeping in the German language.

SCHREINER, shrī'nĕr, OLIVE (1862—). An English novelist, the daughter of a Lutheran clergyman sent as a missionary from England to South Africa. She was born in Basutoland, South Africa, in 1862. In 1894 she married Mr. Cronwright. When about twenty years old she visited England, bringing with her the manuscript of her *Story of an African Farm*. After receiving the approval of George Meredith it was published with a few alterations in 1883 under the pseudonym of Ralph Iron and won instant success. It is best described as a spiritual autobiography representing the mental reaction by which an imaginative sensitive temperament passes from extreme Calvinism to hopeless atheism. Her other works include *Dreams* (1891), *Dream Life and Real Life* (1893), and *Trooper Peter Halket* (1897). In the South African War Mrs. Cronwright's sympathies were with the Boers. She expressed her opinions in *An English South African's View of the Situation* (1899).

SCHREVELIUS, skrē-vē'lī-ŭs, CORNELIS (c.1615-c.64). A Dutch classical scholar, born at Haarlem and educated mainly by his father, whom he succeeded in 1664 as rector of the University of Leyden. Schrevelius was a diligent and erudite man, but possessed little critical discernment. His most notable work was a *Lexicon Manuale Græco-Latinum et Latino-Græcum* (Leyden, 1654), which passed through many editions.

SCHREYER, shrī'ĕr, ADOLF (1828-99). A German painter. He was born in Frankfort, where he received his artistic training at the Städel Institute, afterwards studying at Düsseldorf and Munich. Later he went to Paris, where he became a follower of Fromentin, depicting

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chiefly Oriental subjects in a style characterized by brilliant color effects and strong dramatic action. He represents such subjects as the "Battle of Temesvár," "Arab Advance Guard," and "Cossacks in a Snow-Storm." He is especially a painter of horses, which he generally portrays in fiery action, their nostrils distended and manes flying in the wind. He at first resided at Frankfort, but after a voyage to Algeria in 1861 he settled in Paris. He received gold medals at Brussels (1863), and at Paris in 1864, 1865, and 1867. Most of the principal American collections possess examples of his work.

SCHRIVER, shrī'vĕr, EDMUND (1812-99). An American soldier, born in York, Pa. He graduated at West Point in 1833, entered the Second Artillery, and served against the Seminoles in 1839. In 1846 he resigned from the army and became treasurer of the Rensselaer and Saratoga and other railroad companies. In 1861 he reëntered the army as aide to Governor Morgan. From 1863 to 1865 he was inspector of the Army of the Potomac, and participated in the Shenandoah and Northern Virginia campaigns, in the battles of Chancellorsville and Gettysburg, and finally in the Richmond campaign. At the end of the war, during which he had risen to the grade of colonel and brevet major-general, he was appointed inspector of the Military Academy, which position he held from 1866 to 1871. He retired from active service in 1881.

SCHRÖCKH, shrĕk, JOHANN MATTHIAS (1733-1808). A German Church historian. He was born in Vienna, studied at Göttingen, became professor at Leipzig, 1762, and at Wittenberg, 1767. He is best known by his monumental *Christliche Kirchengeschichte,* 35 vols. (1768-1803), and *Kirchengeschichte seit der Reformation,* 10 vols. (1804-12), the last two volumes of which were added by H. G. Tzschirner. He also published *Allgemeine Biographie,* 8 vols. (1767-91), and *Lebensbeschreibungen berühmter Männer* (1789-91). Consult his *Life* by Tzschirner (Leipzig, 1812).

SCHRÖDER, shrē'dĕr, FRIEDRICH LUDWIG (1744-1816). A noted German actor and dramatist, born at Schwerin. He early became an actor and achieved great fame, especially in tragic rôles. He became manager of the theatre at Hamburg in 1771. His management was distinguished for the high artistic standard which he maintained in his company and particularly for his introduction of several of Shakespeare's tragedies to the German public, perhaps his own best rôle being that of Lear. His work as a dramatist consisted largely of adaptations from the English. Consult his *Dramatische Werke,* with an introduction by Tieck (Berlin, 1831), and Litzmann, *Friedrich Ludwig Schröder* (Hamburg, 1890-94).

SCHRÖDER, KARL (1838-87). A German gynæcologist, born in Neustrelitz and educated at Würzburg and Rostock. In Bonn he was assistant to Veit (1864-66) and docent, and in Erlangen he was from 1868 to 1876 professor and director of the lying-in hospital. From 1876 till his death he was professor in Berlin. He was a skillful and original operator, and the first to practice ovariotomy successfully in Germany. He wrote *Lehrbuch der Geburtshilfe* (1870; revised by Olshausen and Veit) and *Krankheiten der weiblichen Geschlechtsorgane* (1874; revised by Hotmeier).

SCHRÖDER, KARL (1848—). A German 'cellist and composer, born at Quedlinburg. He studied with Drechsler at Dessau and with Kiel at Berlin. In 1871 he organized with his three brothers the Schröder Quartet, but in 1873 he was appointed first 'cello in the Brunswick Court Orchestra, in 1874 solo 'cellist in the Gewandhaus Orchestra at Leipzig, and in 1881 became Court kapellmeister at Sondershausen. After 1866 he conducted successively the Opera at Amsterdam, Berlin, and Hamburg. He wrote a three-act opera, *Aspasia* (1892), a one-act opera, *Der Asket* (1893), a method and études for the 'cello.—ALWIN (1855—), his brother, was born at Neuhaldensleben. He received the appointment of first 'cello in Liebig's concert orchestra in 1875, occupied similar positions under Fliege and Laube at Hamburg, and in 1880 went to Leipzig as assistant to his brother Karl, succeeding him in the Gewandhaus. In 1886 he went to Boston, where he became a member of the Kneisel Quartet and first 'cellist in the Boston Symphony Orchestra.

SCHRÖDER, SOPHIE (1781-1868). A German actress. She was born at Paderborn, the daughter of an actor named Bürger. She appeared on the stage when only twelve years old, at Saint Petersburg, where her mother was acting. In 1795 she married Stollmers, the director of a company at Reval, but was separated from him soon afterwards. Her second husband, to whom she was married in 1804, was the singer Friedrich Schröder. He died in 1818, and she afterwards married the actor Kunst. She acted in all the principal theatres in Germany, and acquired a great reputation by her impersonations of Phædra, Medea, Lady Macbeth, and other tragic characters. She retired from the stage in 1840 and resided then in Augsburg. Consult Schmidt, *Sophie Schröder* (Vienna, 1870).

SCHRÖDER-DEVRIENT, de-vryän', WILHELMINE (1804-60). A German dramatic soprano, born in Hamburg. She studied with Mazatti of Vienna, and in 1821 at Vienna sang the rôle of Pamina in *The Magic Flute,* in which her success was so great as to secure for her the part of Fidelio in 1822, in which rôle she won wide reputation. Although possessed of a magnificent voice, she was deficient in technique, a fault which was usually lost sight of in the intensity of her acting.

SCHRÖDTER, shrē'tĕr, ADOLF (1805-75). A German genre painter, engraver, and illustrator, born at Schwedt, Brandenburg. He studied line engraving under Buckhorn, and painting under Schadow, principally at Düsseldorf, where he became the satirist of the school, ridiculing its sentimentality in humorous paintings, engravings, and lithographs. He designed series of such subjects as *Don Quixote, Münchhausen, Till Eulenspiegel, Much Ado About Nothing,* and illustrated a number of works, the best known of which is perhaps Detmold's *Leben und Thaten des Abgeordneten Piepmeier* (1848). Among his best known paintings are the "Wine Tasters" (1832), a "Rhenish Tavern Scene" (1833), "Don Quixote Studying Amadis" (1834), and "Fluellen with Ensign Pistol" (1839), all in the National Gallery, Berlin, and "Faust in Auerbach's Cellar" (1848). He excelled in friezelike compositions, of which a well-known example

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is "The Four Seasons," executed in water-colors (Karlsruhe Gallery). He was also an excellent etcher.

SCHROEDER, shrē'dĕr, LEOPOLD VON (1851—). A German Sanskrit scholar, born in Dorpat, and educated there and under Roth in Tübingen. After having been docent at Dorpat he became professor of Sanskrit at Innsbruck in 1894, and at Vienna in 1899. His most important work is the valuable and very condensed *Indiens Litteratur und Kultur* (1887). Besides, he edited the *Maitrāyani Samhita* (1881-86), and the *Kāṭhakam, die Saṁhita der Kāṭha-Çākhā* (1900), and published *Die formelle Unterscheidung der Redeteile im Griechischen und Lateinischen* (1874), *Pythagoras und die Inder* (1884), *Griechische Götter und Heroen* (1887), *Hochzeitsbräuche der Esthen* (1888), and *Worte der Wahrheit*, a version of Buddhist proverbs (1892); the tragedy *König Sundara* (1887), and poetical versions of Sanskrit songs and proverbs, *Mangoblüten* (1892), and of Indian dramas for the German stage, *Prinzessin Zofe* and *Sakuntala* (1893).

SCHUBART, shōō'bärt, CHRISTIAN FRIEDRICH DANIEL (1739-91). A German poet and musician, born at Obersontheim, in Swabia. In 1763 he became a preceptor in Geisslingen, and six years afterwards he was made director of music and organist in Ludwigsburg, but on account of quarrels and a parody he wrote upon the litany he was forced to leave. He led a restless and dissipated life at Heidelberg, Mannheim, Munich, Augsburg, and Ulm. At Augsburg he started in 1774 the *Deutsche Chronik*, a periodical, which met with universal favor in Germany. For ten years, from 1777 to 1787, he was arbitrarily imprisoned in the fortress of Hohenasperg by Duke Charles of Württemberg. After his release he put himself under the protection of the King of Prussia, and was made director of music of the Court and theatre at Stuttgart. Though not belonging to the school of *Sturm und Drang*, Schubart possessed much of its spirit. While in prison he published an edition of his *Sämtliche Gedichte*. Among his finest single poems are "Die Fürstengruft" and "Hymnus auf Friedrich den Grossen." His complete works were published in eight volumes at Stuttgart in 1839-40.

SCHUBERT, shōō'bĕrt, FRANZ (1797-1828). A famous Austrian composer. He was born January 31, 1797, in Vienna. His violin lessons began at the age of eight. A few lessons from an elder brother, Ignaz, sufficed to start him on the pianoforte, and he continued to study by himself. In 1808 he passed his examination for the Court choir. The manuscript of a piano duet, *Leichenfantasie*, after Schiller, bears date April 8–May 1, 1810. He was not then fourteen; the next year was important in his development as a composer, for from it date his first songs, "Hagar's Klage" and "Der Vatermörder." Salieri, who was one of the instructors at the "Stadtconvict," where Schubert received a general schooling, was so struck with "Hagar's Klage" that he made arrangements for Ruczizka to give the boy lessons in harmony. At this time Franz already had composed chamber music, which he took home with him on holidays and tried over in the family circle. His brothers, Ferdinand and Ignaz, played first and second violin, Franz himself viola, and his father 'cello.

In 1813 he began work on an opera, *Des Teufels Lustschloss*, and composed a symphony. During this year his voice broke, and he was obliged to leave the choir. Some of his most important compositions were written during this period—between his seventeenth and twentieth years. At this time, too, he formed a close attachment for Mayrhofer, whose melancholy disposition was the very opposite of Schubert's joviality. Of *Des Teufels Lustschloss*, finished in 1814, only the first and third acts remain. The composer gave the score to Josef Hüttenbrenner for a small debt, and in 1848 a servant lit the fire with the second act. Several of Schubert's other scores also met with a similar fate. One of his best masses, that in F, dates from this year.

In 1816, when he was only nineteen years old, he wrote his most famous song, "The Erlking," and another almost as famous, "The Wanderer." Josef Spaun, who had provided him with music paper at the choir school, chancing to call upon him one afternoon found him working excitedly over Goethe's poem. The very same evening the composer appeared at the school with the finished song. It seems incredible at this day that five years should have elapsed before this immortal song was heard in public, yet such was the case. Previously, however, it had been sung frequently in private. To the "Erlking" year belongs, besides many other compositions, the *Tragic Symphony*. Although his application for the post of musical instructor in Laibach was unsuccessful, he was able to obtain freedom from the drudgery of teaching through the generosity of one of his admirers, Franz von Schober. He was a student at the University of Vienna, who, having heard some of Schubert's songs, recognized the genius of their composer, and invited Schubert to live with him. It was through this friend that Schubert was introduced to the famous barytone Johann Michael Vogl, who made many of his songs known.

In 1818 Count Johann Eszterházy offered Schubert the post of music teacher in his family, with a residence in winter in Vienna and in summer at Zelész, in Hungary. This arrangement, however, did not last long, for early in 1819 Schubert again was sharing Mayrhofer's quarters in Vienna.

The first public performance of a song by Schubert appears to have been at a concert in 1819, when the "Schäfer's Klagelied," sung by Franz Jäger, a tenor, was received with applause. About the same time he sent some of his settings of Goethe's poems, among them "The Erlking," to the poet. The latter, however, never acknowledged them; nor did he appreciate "The Erlking" until late in life, when he heard it sung by Schröder-Devrient. Vogl induced the management of the Kärnthnerthor Theatre to commission Schubert to set to music the farcical *Die Zwillingsbrüder*. It was produced in June, and had six repetitions, without, however, making a decided impression.

Despite the large number of Schubert's compositions, and the fact that they were being more and more performed and admired in private circles, not one of them had yet been published. In 1821 Leopold von Sonnleithner, to put an end to the disgraceful neglect to which the composer was subject in his native city, took "The Erlking"

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to the publishing houses of Diabelli and Haslinger. Both absolutely declined it, giving as reasons that the composer was unknown and that the accompaniment was too difficult. Sonnleithner then persuaded three others to share the expense with him, and had the song printed by Diabelli on commission. Other songs of his now were published and sold well, and he would have found himself in fairly comfortable circumstances had he not been absolutely without business instinct.

In December, 1823, he finished the opera *Alfonso und Estrella*, on which, off and on, he had been engaged for some time. The libretto is by Schober, and it is said that Schubert set Schober's lines to music as rapidly as the librettist wrote them. The opera was not brought out until 1854, when Liszt produced it at Weimar, but unsuccessfully, largely owing to the wretched libretto. One of Schubert's finest works, the *Unfinished Symphony*, dates from this period. This fragment consists of the first and second movements, which are familiar to concert goers, and nine bars of the scherzo. These are fully scored, but with them the manuscript comes to a complete stop, not even the the most meagre sketch of the remainder having been discovered. This exquisite fragment was presented in its unfinished state by Schubert to the Musikverein at Gratz, in recognition of his election to membership, but was not heard until 1865, when it was performed in Vienna. Some incidental music written for *Rosamunde, Princess of Cyprus*, pleased greatly; but Schubert's genius seems to have been too lyric for opera, and of his few stage works which have been heard, only the little opera *Der häusliche Krieg*, which remained unknown until 1861, when it was brought out in Vienna, has had any success. The year 1823 is noteworthy for the composition of his charming song cycle *Die schöne Müllerin*.

During the few remaining years of his brief life he composed several of his finest works, most notable among them his great symphony in C. He presented the score to the Gesellschaft der Musikfreunde, of Vienna, in return for a purse of 100 florins, which they had voted him. They placed the symphony in rehearsal, but abandoned it as too difficult. The score was discovered in 1838 in Ferdinand Schubert's possession by Schumann, and by him sent to Mendelssohn, who produced it at a Gewandhaus concert, Leipzig, March, 1839. On November 4, 1828, Schubert called on the Court organist, Sechter, to arrange for lessons in counterpoint. Soon afterwards he took to the bed from which he never rose. "Die Taubenpost," the last of the *Schwanengesang*, composed in October, 1828, is generally regarded as his last composition. In the early stages of his final illness (typhoid) he gave some time to correcting the proof-sheets of his song cycle *Die Winterreise*. He died November 19th, and was buried near Beethoven's grave.

There is no doubt that as an orchestral composer Schubert had but just 'found himself' in the C symphony, now ranked among the finest compositions of its class. It is not unlikely that, having established so high a standard for himself, he would have followed this symphony with others, but, allowing for the possibility of a decline in his powers, the world may well be satisfied with what he left. No composer, except Bach, has gained so much in fame since his death. With the pure melodic line he combined in his *Lieder* wonderful powers of vocal expression, as well as vividness of description in the accompaniments. Notable examples are *The Erlking*, *Die junge Nonne*, in which the accompaniment gives the tolling of a bell above a raging storm, and *Auf dem Wasser zu singen*, in which the water fairly ripples and sparkles around the vocal melody. The known list of his songs is over 600. Perhaps it was because Schubert's fame as a song composer overshadowed his other achievements that the latter were so tardily recognized at their full worth. His fascinating waltzes (the *Soirées de Vienne* in Liszt's arrangement) and his highly characteristic *Impromptus* and *Moments Musicaux* are frequently heard. In chamber music it is only necessary to mention his superb string quintet with the two 'cellos, the pianoforte trios, and the D minor string quartet to fix his rank. At least two of his masses and several of his smaller choral works are highly valued.

Consult: Kreissle von Hellborn, *Franz Schubert, eine biographische Skizze* (Vienna, 1861; enlarged ed. 1865; English trans. by Coleridge, London, 1869), the most scholarly work; Frost, *Schubert* (London, 1888), a good popular biography; and the biographies by Reissmann (Berlin, 1873), Niggli (Leipzig, 1880), Friedländer (ib., 1883), and Heuberger (Berlin, 1902).

SCHUBIN, shōō'bĭn, Ossip. The pseudonym of the German novelist Lola Kirschner (q.v.).

SCHUCH, shōōg, Werner (1843—). A German painter, born at Hildesheim. He studied architecture at the Polytechnic Institute of Hanover, after which he practiced his profession as architect and engineer until 1870, when he became professor at the Institute. He then took up the study of painting, continued it (1876) at Düsseldorf, and after his return to Hanover, in 1878, painted his first historical picture, "The Transportation of the Body of Gustavus Adolphus to Wolgast" (City Hall, Nuremberg). Having lived in Munich (1882-86), Berlin (until 1893), and Dresden (1895-99), he finally settled in Berlin. His other works include "From the Time of Dire Need" (1877), "General Zieten at Hennersdorf" (1886), "General Seydlitz at Rossbach" (1886), "Battle of Möckern" (1895), all in the National Gallery at Berlin; "In Winter Quarters" (1884, Münster Gallery); "General Seydlitz Reconnoitring" (1885, Breslau Museum); "Apotheosis of Frederick III." (1893, Danzig Museum); and the mural painting "The Allied Monarchs at Leipzig" (1888, Feldherrenhalle, Arsenal, Berlin). Schuch is also known as a portrait painter and illustrator.

SCHUCHARDT, shōōg'ärt, Hugo (1842—). A German Romance philologist, born at Gotha. He was educated in the universities of Jena and Bonn. In 1873 he was appointed professor of Romance philology at Halle, whence he was called in 1876 to Gratz. His publications include: *Vokalismus des Vulgarlateins* (3 vols., 1866-68); *Ritornell und Terzine* (1874); *Slawo-Deutsches und Slawo-Italienisches* (1884); *Romanisches und Keltisches* (1886); *Aus Anlass des Volapüks* (1888); *Baskische Studien* (1893); and *Weltsprache und Weltsprachen* (1894).

SCHÜCKING, shuk'ĭng, Levin (1814-83). A German novelist, born near Münster. He studied law at Munich, Heidelberg, and Göttingen, but,

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after returning to Munich, gave up the law for letters. His first efforts, published in 1842, were descriptive: *Das malerische und romantische Westfalen*, and *Der Dom zu Köln und seine Vollendung*. In 1843 he went to Augsburg as one of the editors of the *Allgemeine Zeitung*, and thence he removed to Cologne to take charge of the *Kölnische Zeitung*. His numerous novels include: *Ein Schloss am Meer* (1843); *Verschlungene Wege* (1867); *Die Heiligen und die Ritter* (1872); *Die Herberge der Gerechtigkeit* (1878); *Das Recht des Lebenden* (1880). After his death appeared *Lebenserinnerungen* (1886). Although not profound, these works are wholesome and agreeable.

His wife, LUISE VON GALL (1815-55), was born in Darmstadt. She published her first volume, *Frauennovellen*, in 1844, and this was followed by the novels *Gegen den Strom* (1851) and *Der neue Kreuzritter* (1853). She was also the author of a successful comedy, *Ein schlechtes Gewissen* (1842).

SCHULTE, shōōl'te, JOHANN FRIEDRICH VON (1827—). A German jurist, born at Winterberg, Westphalia. In 1854 he became professor of canon law at Prague. His opposition to the doctrine of Papal infallibility, as consistorial councilor, attracted much attention and criticism. In 1873 he became professor at Bonn. From 1874 to 1879 Schulte was a member of the German Reichstag, where he voted with the National Liberals. He is considered an authority on canon law. His publications include: *System des katholischen Kirchenrechts* (1855); *Die Lehre von den Quellen des katholischen Kirchenrechts* (1860); *Die Rechtsfrage des Einflusses der Regierung bei den Bischofswahlen* (1869).

SCHULTENS, skụl'tĕns, ALBERT (1686-1750). A Dutch Semitic scholar. He was born in Groningen, studied there, at Utrecht, and at Leyden, and after two years as pastor at Wassenaar, near Leyden, in 1713 became professor of Oriental languages at Franeker, whence in 1729 he removed to Leyden. There he became professor of Arabic—the study of which he insisted was a necessary adjunct to Hebrew—and of Hebrew antiquities. He was the first comparative philologist in Semitics, and wrote *Institutiones ad Fundamenta Linguæ Hebraicæ* (1737), *Origines Hebrææ* (1724-38), the unfinished *Institutiones Aramææ* (1745-49), and versions, with commentaries, of Job (1737) and of the Book of Proverbs (1748).

SCHULTZ, shụlts, ALWIN (1838—). A German art critic and historian, born at Muskau, Lusatia. After studying archæology and Germanic philology at Breslau, he established himself there as docent for art-history in 1866, was appointed professor in 1872, and called to the University of Prague in 1882. His most important publications include: *Schlesiens Kunstleben im 13. bis 18. Jahrhundert* (1870-72); *Die Legende vom Leben der Jungfrau Maria und ihre Darstellung in der bildenden Kunst des Mittelalters* (1878); *Das höfische Leben zur Zeit der Minnesinger* (2d ed. 1889); *Kunst und Kunstgeschichte* (2d ed. 1901); *Deutsches Leben im 14. und 15. Jahrhundert* (1892); and *Allgemeine Geschichte der bildenden Künste* (1894 et seq.).

SCHULTZ, Sir JOHN CHRISTIAN (1840-96). A Canadian administrator, born in Amherstburg, Ontario, and educated at Victoria University (M.D., 1861). In Riel's Rebellion (1870) Schultz was imprisoned and condemned to death by Riel for loyalty to the British flag and the Canadian party. From 1871 to 1882 he was a member of the Dominion House of Commons and from 1888 to 1895 Lieutenant-Governor of Manitoba. Schultz was a member of the Executive Council of the Northwest Territories, and president of the Manitoba Southwestern Railway. He died suddenly in Monterey, Mexico, about a year after he became K. C. M. G.

SCHULTZE, shụl'tse, FRITZ (1846—). A German philosopher, born at Celle and educated at Jena, Göttingen, and Munich. He was professor extraordinary of philosophy at Jena in 1875-76 and became in the latter year professor of philosophy and pedagogy in the Royal Polytechnic Institute of Dresden. Among his works may be named: *Der Fetischismus: Ein Beitrag zur Anthropologie und Religionsgeschichte* (1871); *Geschichte der Philosophie der Renaissance* (1st vol. 1874); *Philosophie der Naturwissenschaft* (1881-82); *Stammbaum der Philosophie* (1890); *Der Zeitgeist in Deutschland, seine Wandlung im 19. und seine muthmassliche Gestaltung im 20. Jahrhundert* (1894).

SCHULTZE, MAX SIGISMUND (1825-94). An eminent German anatomist and cytologist. He was born at Freiburg in Breisgau. After 1845 he studied at Greifswald and Berlin. In 1854 he was appointed adjunct professor in Halle, and in 1859 was called to the chair of anatomy in the University of Bonn. His chief works are on turbellarian worms (1851); on the Foraminifera of the Adriatic Sea (1854); on the embryology of various worms and of the lamprey; on the mode of termination of the finer nerves in the organs of sense; and on the electric organs of fishes; but his most notable contribution to general biology was his work on the nature of protoplasm and of cells (q.v.). He was the first, after Dujardin, to establish the nature of protoplasm of rhizopods and to show that it was the fundamental substance of both animals and plants. His results are embodied in his tract *Das Protoplasma der Rhizopoden und der Pflanzenzellen. Ein Beitrag zur Theorie der Zelle* (Leipzig, 1863). He adopted Mohl's term 'protoplasm,' applied by that botanist to plants alone, and extended it to include that of animals. Schultze was also the founder and editor of the *Archiv für mikroskopische Anatomie*.

SCHULZ, shụlts, ALBERT (1802-93). A German writer on mediæval literature, especially the Arthurian legends. He was born at Schwedt, studied law, and entered the judicial service at Magdeburg. His valuable studies in his special field, published under the pseudonym San Marte, include a version of the "Parzival" in *Leben und Dichten Wolframs von Eschenbach* (1836-41), *Die Arthursage* (1842), *Nennius und Gildas* (1844), *Beiträge zur bretonischen und keltisch-germanischen Heldensage* (1847), and *Rückblicke auf Dichtungen und Sagen des deutschen Mittelalters* (1872).

SCHULZ, JOHANN ABRAHAM PETER (1747-1800). A German composer, born at Lüneburg. He studied with Kirnberger at Berlin, taught there, and became musical director at the French theatre in 1776, holding the appointment for two years. In 1780 he became Kapellmeister to Prince Heinrich at Rheinsberg and afterwards

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was conductor at Copenhagen. He published: *Gesänge am Cluvier* (1779) and *Lieder im Volkston* (1782), which were printed together, with augmentations, as *Lieder im Volkston* in 1785; *Chansons Italiennes* (1782); operettas and operas; the oratorio *Johannes und Marie;* and the passion cantata *Christi Tod.* He was a song composer of great originality.

SCHULZ, MORITZ (1825-1904). A German sculptor, born at Leobschütz, Upper Silesia. He studied at the Industrial School in Posen, at the Berlin Academy, and as a pupil of Friedrich Drake. From 1854 to 1870 he lived in Rome, studying the old masters and executing numerous works. Upon his return he prepared for the Monument of Victory in the Königsplatz of Berlin a bronze relief of the battle of Königgrätz. A series of decorations by him representing elementary instruction in the arts of painting and sculpture occupies a place in the entrance to the National Gallery, together with a frieze, 22 meters in length, depicting "The Triumph of the Artists," or the history of German art as displayed in its chief representatives. His further works include a statue of Frederick the Great for Thorn, and numerous subjects derived from allegory or classical mythology.

SCHULZE, shul'tse, ERNST (1789-1817). A German poet, born at Celle. He studied theology at Göttingen, but afterwards devoted himself to philology. The death of Cäcilie Tychsen, in whose memory his epic *Cäcilie* (1818) was written, clouded all his later life. His writings are romantic in style and mainly in allegorical form. The epic *Die bezauberte Rose* (1818), his last work, is a poem of classic beauty of style. *Sämtliche poetische Werke* were edited by Bouterwek (3d ed., with biography by Marggraff, Leipzig, 1855).

SCHULZE, FRANZ EILHARD (1840—). A German zoölogist, born in Eldena and educated at Rostock and Bonn. He was professor at Rostock 1865-73, at Gratz, until 1884, and then at Berlin, where he became director of the Zoölogical Institute. Schulze sailed in the *Pomerania* expedition, while he was at Rostock; specialized on sponges, and wrote *Amerikanische Hexactinelliden.* His most important single discovery was that of the sponge Halisarca, a mere germinal cell (1877).

SCHULZE, FRIEDRICH AUGUST (1770-1849). A German novelist, born in Dresden. His first novel, *Der Mann auf Freiersfüssen* (1801), was favorably received, but his work as a whole is without particular value. Under the pseudonym Friedrich Laun he wrote many volumes, and with Apel edited a *Gespensterbuch* (1810-14).

SCHULZE, FRIEDRICH GOTTLOB (1795-1860). A German economist, born at Obergävernitz, near Meissen, and hence called Schulze-Gävernitz. He was educated at Leipzig and Jena; became professor in the latter university in 1821, and, after founding there an agricultural institute, the first connected with a German university, in 1832 went to Greifswald, where he established a similar training school. These institutions exercised great influence throughout Germany. In 1839 he returned to Jena. Schulze wrote *Deutsche Blätter für Landwirtschaft und Nationalökonomie* (1843-59), *Nationalökonomie oder Volkswirtschaftslehre* (1856), and the posthumous *Lehrbuch der allgemeinen Landwirtschaft* (1863). A memorial to him was erected at Jena in 1867. Consult: Birnbaum, *Schulze als Reformator der Landwirtschaftslehre* (Frankfort, 1860), and the biography by his son, Hermann (Heidelberg, 1888).

SCHULZE, JOHANNES (1786-1869). A German educator and administrator. He was born at Brühl, in Mecklenburg-Schwerin, studied at Halle, and taught at Weimar and Hanau. In 1813 he became chief counselor on education in Frankfort, in 1815 a member of the Coblenz consistory, and in 1818 referendary to the Prussian Ministry of Education in Berlin, a post he kept until 1840, and one in which his great work of reforming the educational methods in the higher schools of Prussia was performed. In 1849 he was appointed director of the Department of Education, an office he resigned ten years afterwards. He was an ardent Hegelian and edited Hegel's *Phänomenologie des Geistes* (2d ed. 1841), and some of Winckelmann's works. Consult Varrentrapp, *Johannes Schulze und das höhere preussische Unterrichtswesen* (Leipzig, 1889).

SCHULZE-DELITZSCH, dā'lĭch, HERMANN (1808-83). A German economist and sociologist, the founder of the German coöperative movement. He was born at Delitzsch, studied jurisprudence at the universities of Leipzig and Halle, and subsequently held judicial positions at Naumburg and Berlin, playing a prominent part in the liberal movement of 1848-49 in Prussia. Schulze-Delitzsch advocated coöperation and devoted himself to the establishment of coöperative associations which should secure to the laborers the benefits of the wholesale market. Coöperative banks were also established, which lent money on moderate terms. He endeavored to accustom the people to rely upon their own initiative to improve their condition. He declared that the function of the State should be limited to assuring industrial and personal liberty. Schulze-Delitzsch's writings are chiefly in the form of pamphlets. His most important doctrines are embodied in: *Information on Professional and Labor Associations* (1850); *Manual of Association for Artisans and German Workmen* (1853); *Suppression of Social Reform by Lasalle* (1866); *Social Rights and Duties* (1867); *Development of Coöperative Associations in Germany* (1870). Consult Bernstein, *Schulze-Delitzsch. Sein Leben und Wirken* (Berlin, 1879).

SCHULZE-GÄVERNITZ, gā'vĕr-nĭts, GERHART VON (1864—). A German economist, born in Breslau. He became professor at Freiburg in 1893, and at Heidelberg in 1896, and then returned to Freiburg. He wrote *Zum sozialen Frieden* (1890), *Grossbetrieb* (1892), *Thomas Carlyles Welt- und Lebensanschauung* (1893), *Volkswirtschaftliche Studien aus Russland* (1899), and other historical and critical studies.

SCHUMACHER, shōō'mäg-ĕr, HEINRICH CHRISTIAN (1780-1850). A Danish astronomer, born at Bramstedt, Holstein. He studied at Kiel, Jena, Copenhagen, and Göttingen. In 1810 he became adjunct professor of astronomy in Copenhagen. In 1813 he was appointed director of the Mannheim observatory, and in 1815 professor of astronomy and director of the Copenhagen observatory. In 1822 he published tables of the distances of Jupiter, Saturn, Mars, and Venus

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from the moon. In 1822 he began the publication of his *Astronomische Nachrichten*, which is still continued in an unbroken series, and is regarded as perhaps the most important of astronomical periodicals. He also published, in coöperation with other eminent astronomers, *Astronomisches Jahrbuch* (1836-44).

SCHUMACHER, PEDER. A Danish statesman, Count Griffenfeld (q.v.).

SCHUMANN, shōō'män, KLARA (1819-96). Wife of Robert Schumann, and under her maiden name, Klara Wieck, one of the best known concert pianists of her generation. She was the daughter of Frederick Wieck (q.v.), from whom she received her musical education. At thirteen years of age she began the concert tours which made her famous and which led to her acquaintance with Schumann. After the death of her husband she lived for several years in Berlin, and during this period wrote some of her most charming songs. From 1878 to 1892 she served on the faculty of the Hoch Conservatorium at Frankfort. Her compositions are largely in the style of her husband, and are marked by much sincerity and some originality. They include: Op. 12, 12 poems by Rückert, set to music by Robert and Klara Schumann (Nos. 2, 4, and 11 by the latter); a pianaforte concerto (op. 7); a trio (op. 17); the violin romances (op. 22); and several preludes, fugues, variations, and exercises.

SCHUMANN, MAX (1827-89). A Prussian military engineer, famous for his efforts to utilize armor-plate in warfare. He was born in Magdeburg. At the time of the American Civil War he became interested in the subject of armored fortifications, which he proceeded to study in England (1863-65). During the Franco-Prussian War he was on fortification duty, and in 1872 he retired, immediately entering the Gruson works. There he devised an armored gun-carriage, an armored mortar-platform, a disappearing carriage, and a steel wire net for defense. A rotary iron-clad tower planned by him was adjudged at Bucharest (1885-86) superior to that of Mougin. Schumann described the salient features of his innovations in *Die Bedeutung drehbarer Geschützpanzer für eine durchgreifende Reform der permanenten Befestigung* (2d ed. 1885), and "Die Panzerlafetten und ihre fernere Entwickelung," in the *Internationale Revue* (1886). Consult Schröder, *Schumann und die Panzerfortifikation* (Berlin, 1890).

SCHUMANN, ROBERT (1810-56). A famous German composer. He was born at Zwickau, Saxony, where his father was a bookseller and publisher. At Zwickau he received little musical instruction beyond piano lessons from an old-fashioned, pedantic teacher, Kuntzsch. Until he was twenty-one years old he had no instruction in composition. He then placed himself under Heinrich Dorn at Leipzig. He had begun to compose, however, according to his own statement, when he was eleven years old, setting the 150th Psalm to music. His father died in 1826, and his mother being violently opposed to his choosing a musical career, Robert in 1828 matriculated at the University of Leipzig as a law student.

Most important at Leipzig was his acquaintance with Friedrich Wieck, a gifted musician, and his daughter Klara, then in her ninth year, and a surprisingly skillful pianist. Schumann placed himself under Wieck's instruction, continuing until 1829, when he entered the University of Heidelberg. As a result of his assiduous devotion to music, he soon became known throughout Heidelberg as a skillful pianist, and even received invitations to play at Mannheim and Mainz. His compositions in 1829 include several short pieces, which afterwards appeared among the *Papillons*, and in 1830 he composed his *Variations on the Name of Abegg*, which owed their origin to the lively impression made upon him by Meta Abegg. In the spring of 1830 Schumann went to Frankfort to hear Paganini. The deep impression the great violinist's playing made upon him is shown by his adaptation and elaboration of several of the famous capriccios for the piano.

Schumann now determined to abandon law and devote himself to music. In notifying his mother he referred her to Wieck for an opinion as to his abilities, and on his mother's writing to Wieck, the latter's decision was in favor of Schumann. He was at last beginning to realize the disadvantage of having neglected theoretical studies. Yet even now he did not take up these at once. On his return to Leipzig he resumed his piano lessons with Friedrich Wieck and lived at his house. An accident for which he himself was responsible forced him to give up piano playing and devote himself wholly to composition. Dissatisfied with the progress he was making as a pianist, he devised a system of digital gymnastics, with the result that he injured the sinews of the third finger of his right hand so severely that he never fully regained its use. It was this forced abandonment of a pianist's career which led him to seek instruction in composition from Heinrich Dorn, who took him as a pupil.

The year 1831 is important because during it Schumann first came before the public as a musical critic, contributing to the *Allgemeine Musik-Zeitung* an enthusiastic critique of Chopin's *Don Juan Fantasia*. In November, 1832, he was in Zwickau, where at a concert given by Klara Wieck, then thirteen years old, a symphony by him in G minor, now wholly unknown, was performed. On his return to Leipzig he removed from the Wiecks' house, but continued on an intimate footing with the family. In 1833 he completed the Paganini transcriptions, and wrote his piano impromptus on a theme by Klara Wieck, a composition which has romantic interest, as the young pianist, with whom his relations at that time were wholly artistic, later became his wife and did much to make his music famous.

In 1834 Schumann and several other enthusiastic musicians and critics banded themselves under the name "Davidsbündler" to wage war against philistinism in music, as David had against the Philistines. They established the *Neue Zeitschrift für Musik*. Schumann's contributions, when not over his own name, were signed Florestan, Eusebius, Meister Raro, "2" and "12." They were of the highest importance, for he possessed the gift of recognizing incipient genius. One of his later critiques in which, under the title "Neue Bahnen," he hailed Brahms, who was almost unknown, as a musical Messiah, is a most notable example of musical prescience. Through the columns of his paper he accelerated the growing fame of Schubert and Mendelssohn,

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aided Franz and Gade, and practically introduced Berlioz to the musical world by his review of the *Symphonie phantastique*. In all matters relating to the achievements of other musicians he was most liberally appreciative, save in the case of Wagner, whom, at first inclined to regard favorably, he afterwards opposed.

Schumann's important musical work of 1834 was the *Etudes symphoniques*. The following year saw the production of two sonatas, the first, in F sharp minor, significantly dedicated "to Klara." Subsequently he went to Vienna in hopes of there placing the *Neue Zeitschrift* on a more remunerative basis, but was unsuccessful. It was during his Vienna sojourn, however, that he visited Schubert's brother Ferdinand and discovered Schubert's great *C major Symphony*. Friedrich Wieck had long opposed the marriage of his daughter to Schumann, but in September, 1840, they were at last united. The years of Schumann's uncertainty regarding the result of his ardent passion had been productive of some of his finest music. "Truly," he wrote to Dorn, "the contest for Klara has yielded much music." Several of the beautiful "Fantasiestücke," "Noveletten," "Nachtstücke," and the "Faschingsschwank aus Wien" for piano; his first symphony; and above all the songs, 138 in number, written in 1840, and including the famous "Liederkreis" and "Dichterliebe" of Heine and "Frauenliebe und Leben" of Chamisso, are among the productions inspired by his love for Klara.

When Mendelssohn founded the conservatory at Leipzig, Schumann, who was on terms of intimacy with him, became one of the instructors, but made little impression as a teacher. Among the important works composed before his removal to Dresden are the choral work *Das Paradies und die Peri* and the celebrated piano quintet. The Schumanns resided in Dresden from 1844 to 1850, when they settled in Düsseldorf. The principal works of the Dresden period are the piano concerto (op. 54), the *C major Symphony*, the opera *Genoveva* (unsuccessfully produced in Leipzig, 1850), the *Manfred* music, and the scenes from Goethe's *Faust*. Schumann's conductorship of the Chorgesang-Verein also was productive of much choral music.

Even while in Dresden he had suffered from attacks of melancholia, and these became frequent after he moved to Düsseldorf, whither he had been called as musical director. Here, nevertheless, he composed the *Rhenish Symphony* (inspired by the festivities incidental to the elevation of the Archbishop of Cologne to the rank of cardinal) and the *D minor Symphony*. On February 27, 1854, during a fit of melancholy, he attempted suicide by jumping into the Rhine. He was rescued and taken to a private asylum at Endenich, near Bonn, where he died, July 29, 1856.

Schumann's compositions are essentially expressions of moods. He was one of the most subjective, most "intimate" of composers, and for this reason most successful in the more compact forms such as the *Lied*, and in one-movement pieces like his "Noveletten" and "Fantasiestücke," or in works consisting of a series of smaller divisions like his "Kinderscenen" and "Faschingsschwank." While this is true in a general way, the piano concerto, piano quintet, sonata in G minor, and his first and second symphonies rank among the best of their kind, though, as regards the symphonies, his orchestration is far from brilliant. In his compositions he was one of the founders, and in his writings the chief advocate of the Neo-Romantic School, and perhaps nowhere have the tendencies of this school found more compact and eloquent expression than in his songs. They differ from those of his immediate forerunner, Schubert, in a closer interknitting of voice and accompaniment, in which respect Brahms is, par excellence, Schumann's successor. Consult the biographies by Wasielewski (Eng. trans., Boston, 1871), Reissmann (Berlin, 1879), Spitta (Leipzig, 1883), Fuller-Maitland, in the "Great Musicians" series (New York, 1884), Erler (Berlin, 1887), Riemann (Leipzig, 1887), and Batka (ib., 1892). Also Jansen, *Die Davidsbündler* (Leipzig, 1893); Wasielewski, *Schumaniana* (Bonn, 1884); and Vogel, *Schumanns Klaviertonpoesie* (Leipzig, 1887).

SCHUMANN-HEINK, hīnk, Ernestine, née Roessler (1861—). A German dramatic contralto, born at Lieben, near Prague. She studied with Marietta von Leclair at Gratz, and made her début at Dresden in 1878, as Azucena in *Il Trovatore*. For four years she sang in Dresden, and from 1883 in the Hamburg Stadttheater. In 1896, at Bayreuth, she took the rôles of Erda, Waltraute, and the first Norn, in *Der Ring des Nibelungen*. She was married to Heink in 1883, and to Paul Schumann in 1893. She made her American début in 1898, and sang with uniform success in Chicago, New York, and other cities.

SCHÜRER, shu'rēr, Emil (1844—). A German Lutheran theologian. He was born in Augsburg, studied theology at Erlangen, Berlin, and Heidelberg, became professor of theology successively at Leipzig, 1873, Giessen, 1878, Kiel, 1890, and Göttingen, 1895. He has published *Die Gemeindeverfassung der Juden in Rom* (1879), *Die ältesten Christengemeinden im römischen Reich* (1894), and, the work by which he is best known, *Geschichte des jüdischen Volkes im Zeitalter Jesu Christi* (1886-90; Eng. trans., 1886-90). After 1876, with Adolf Harnack, he edited the *Theologische Litteraturzeitung*.

SCHURMAN, shur'mân, Jacob Gould (1854—). An American educator, born at Freetown, Prince Edward Island. He began his academic education at Acadia College, Nova Scotia, and in 1875 won the Gilchrist Canadian Scholarship at the University of London, where he received his degree in 1877. Afterwards he studied at the University of Edinburgh, and at Heidelberg, Berlin, and Göttingen. From 1880 to 1882 he was professor of psychology, political economy, and English literature at Acadia College; from 1882 to 1886 was professor of English literature and philosophy at Dalhousie College, and in the latter year became professor of philosophy at Cornell University. In 1891 he was appointed dean of the Sage School of Philosophy at Cornell, and in 1892 succeeded Charles Kendall Adams (q.v.) as president of the university. He became editor of the *Philosophical Review* in 1892. In January, 1899, he was appointed by President McKinley chairman of the first Philippine Commission, and spent the greater part of the succeeding year in the Philippine Islands. His publications include: *Kantian Ethics and the Ethics of Evolution* (1881); *The Ethical Import of Darwinism* (1888); *Belief in God* (1890); *Agnosticism and*

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Religion (1896); and *Philippine Affairs: A Retrospect and an Outlook* (1902).

SCHURZ, shurts, CARL (1829—). A German-American soldier and political leader, born at Liblar, Prussia. He was educated at the gymnasium of Cologne and the University of Bonn, at which latter place he became the associate of Gottfried Kinkel (q.v.), then professor at Bonn, in the publication of a liberal newspaper, and was engaged in the revolutionary movement of 1848-49, as a result of which he was forced to retire to Switzerland. In 1850 Schurz returned secretly to Germany, and with great skill succeeded in bringing about the memorable escape of Kinkel from the fortress of Spandau. After a residence in Paris as correspondent for German papers, and in London, where he was a teacher, he emigrated to the United States in 1852, settling first in Philadelphia and afterwards in Wisconsin, where he made Republican campaign speeches in German in 1856, and the next year was an unsuccessful candidate for Lieutenant-Governor. In 1859 he began to practice law in Milwaukee. He was a delegate to the National Republican Convention in 1860, and delivered both English and German speeches, of remarkable eloquence, during the canvass of that year. In 1861 he was appointed Minister to Spain by President Lincoln, but resigned on the outbreak of the Civil War and joined the army. He was made brigadier-general in 1862; commanded a division at the second battle of Bull Run, was commissioned major-general in 1863, led the Eleventh Corps at Chancellorsville, participated in the battles of Gettysburg and Chattanooga, and at the close of the war made a tour of inspection through the Southern States as a special commissioner appointed by President Johnson to inquire into the condition of affairs in the seceded States, his report having considerable influence. He was Washington correspondent of the New York *Tribune* in 1865-66, founded the Detroit *Post* in 1866, and the next year became editor of the Saint Louis *Westliche Post*.

From 1869 to 1875 he served as United States Senator from Missouri. He opposed many of the measures of the Grant administration, took a leading part in the organization of the Liberal Republican movement, and in 1872 presided over the Cincinnati convention which nominated Greeley for President. He supported Hayes in 1876, and afterwards served in his Cabinet as Secretary of the Interior (1877-81). In 1881-84 he was editor of the New York *Evening Post*. In the Presidential campaign of 1884 he was one of the earliest among the Independent Republicans to repudiate the nomination of Blaine, and in New York, New Jersey, Connecticut, and several Western States, he made vigorous speeches, favoring the election of Cleveland. During his term of office as Secretary of the Interior and after his retirement from public life, he was an enthusiastic advocate of civil-service reform, in support of which he wrote many articles and reports and delivered many speeches. His publications include biographies of Henry Clay (1887) and of Abraham Lincoln (1891).

SCHÜTT, shut. Two islands in the Danube, situated in the Hungarian plain between Pressburg and Komorn, and mostly in these two counties. GREAT SCHÜTT ISLAND is bordered by the Danube proper on the south and west, and by the Little Danube and the Schwarzwasser (Oeregduna) (Map: Hungary, E 3). It is 58 miles long, from 10 to 20 miles wide, and is subject to the floods of the rivers, being low and even. Owing to its rich soil, it is called the Golden Garden of Hungary. Grain, fruits, and vegetables are raised. There are sugar factories. It has several towns, including Komorn, which is situated in the southeast corner of the island. The total population is about 23,500.—LITTLE SCHÜTT ISLAND, bordered by the Danube proper on the north and east, and by the Wieselburger Danube, and lying to the southwest of Great Schütt Island, is 28 miles long. It belongs to the counties of Raab and Wieselburg.

SCHÜTZ, shuts, HEINRICH, known by the Latinized form of his name as SAGITTARIUS (1585-1672). The most important German composer of the seventeenth century, born at Köstritz, near Gera, Saxony. At the age of fourteen he became a chorister of the Court Chapel at Cassel, in which city he also attended the gymnasium. In 1607 he went to Marburg University, to study jurisprudence. He abandoned the law, however, and went to Italy, where he studied under Giovanni Gabrieli until the death of that master in 1612. In 1617 he was appointed Kapellmeister to the Elector of Saxony in Dresden, with whose orchestra he had been connected for two years. He was a prolific composer and writer and has been well described as "standing at the parting of the ways between Palestrina and Bach." In his writing he combined the impressive Italian choral style with the new dramatic monodic style of Monteverde. He was the composer of the first German opera, *Dafne* (1627).

SCHUYLER, skī'lĕr, EUGENE (1840-90). AN American diplomat and historian. He was born in Ithaca, N. Y. After graduation at Yale (1859), he practiced law in New York, entered the diplomatic service (1866), was made consul at Moscow (1867-69), at Reval (1869-70), and secretary of legation at Saint Petersburg (1870-76). In 1873 he traveled for eight months through Russian Turkestan, Khokan, and Bokhara, and wrote *Turkestan* (1876). In 1876 he was made secretary of legation and Consul-General at Constantinople, and prepared a report on Bulgarian atrocities that had international consequences. He was subsequently consul at Birmingham (1878) and Rome (1879), chargé d'affaires and Consul-General at Bucharest (1880), and (1882-1884) Minister Resident and Consul-General to Greece, Servia, and Rumania; then, returning to America, he devoted himself to literary work. He was Consul-General at Cairo till his death. His chief books are *Peter the Great, Emperor of Russia* (1884) and *American Diplomacy and the Furtherance of Commerce* (1886). His chief essays were posthumously collected in *Italian Influences*, with an accompanying volume *Selected Essays, with a Memoir by Evelyn Schuyler Schaeffer* (1901). Schuyler was also translator of Turgenieff's *Fathers and Sons* (1867) and Tolstoy's *The Cossacks* (1878).

SCHUYLER, MONTGOMERY (1843—). An American journalist, born in Ithaca, N. Y. He studied at Hobart College, but did not graduate, and in 1865 joined the staff of the New York

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World, remaining with that paper in various capacities until 1883, after which he was an editorial writer on the New York *Times*. He made a special study of architecture, upon which subject he was a frequent contributor to magazines. He published *The Brooklyn Bridge* (1883), with William C. Conant, and *Studies in American Architecture* (1892).

SCHUYLER, PHILIP (1733-1804). An eminent American soldier and statesman, born November 20, 1733, at Albany, N. Y. Entering the English army on the outbreak of the French and Indian War, he served as captain in 1755, and as captain and commissary in 1756. In 1757 he resigned, but reëntered the army, as major, in 1758, and served as such until the close of the war. He was elected to the Colonial Assembly in 1768, and in May, 1775, was a delegate to the Continental Congress, by which he was made a major-general on June 19. Being assigned by Washington to the command of the Northern Department, he organized the expedition against Canada, which was to proceed by way of Lake Champlain, but he was forced by illness to depute the active leadership of the invading troops to General Richard Montgomery (q.v.). Returning to Albany, he directed operations against the Indians and Tories, and, as Indian Commissioner, carried on important negotiations with the Six Nations. Meanwhile General Horatio Gates (q.v.) and many of the New England delegates, who had been offended by Schuyler's attitude in the New-York-Massachusetts boundary disputes, began scheming for his removal; and in September, 1776, disgusted at these intrigues, he sent in his resignation, which, however, was not accepted by Congress. In April, 1777, a Congressional court of inquiry strongly commended him for his conduct hitherto, but the attacks continued, being especially bitter after St. Clair's evacuation of Ticonderoga, and on August 19 General Gates was appointed to supersede him in command of the Northern Department. Schuyler, however, remained with the army and assisted very materially in the operations against Burgoyne. A court-martial, convened in October, 1778, acquitted him with the highest honor of all charges, and his resignation having been accepted April 19, 1779, he became one of New York's representatives in Congress, serving until 1781. After the war he was one of the leaders of the Federalist Party, and held many important State offices, besides representing New York in the United States Senate in 1789-91 and again in 1797-98. While serving in the State Senate he helped codify the New York laws, and ardently advocated the building of State canals. Throughout his public career he was conspicuous for his great abilities, his stanch patriotism, and his unselfish devotion to duty. His daughter Elizabeth married Alexander Hamilton. Consult his *Life* by Lossing (New York, 1872) and Tuckerman (ib., 1903).

SCHUYLKILL, skōōl'kĭl. A river of Pennsylvania, rising in the highlands of Schuylkill County and flowing southeast 125 miles to the Delaware, which it joins at Philadelphia (Map: Pennsylvania, F 3). It has been improved for slack-water navigation nearly to its source; it furnishes the greater part of Philadelphia's water supply, and affords extensive wharfage in its course through the city.

SCHWAB, shväb, GUSTAV (1792-1850). A German poet, scholar, and pastor, born at Stuttgart. He studied at Tübingen, taught at Stuttgart, became pastor at Gomaringen (1837) and in Stuttgart (1841). In poetry he regarded himself as "the eldest pupil of Uhland," but he lacked his classic simplicity and sense of form. Several of his ballads are deservedly popular for their purity and warmth of feeling. His *Gedichte* (1828-29) were revised and pruned as *Neue Auswahl* (1838) and are still reprinted. Schwab wrote in prose a *Life of Schiller* (1840), *Die schönsten Sagen des klassischen Altertums* (1838-40; often reëdited), *Deutsche Volksbücher* (1843; often reprinted), and a *Wegweiser durch die Litteratur der Deutschen* (1846). Consult Klüpfel, *Gustav Schwab als Dichter und Schriftsteller* (Stuttgart, 1884).

SCHWAB, shwäb, JOHN CHRISTOPHER (1865—). An American economist and historian, born in New York City. He graduated at Yale in 1886, and after postgraduate study there, at Berlin, and at Göttingen, became professor of economics at Yale in 1898. He wrote *History of the New York Property Tax* in the publications of the American Economic Association (vol. v., 1890; and in German in the *Jenaer staatswissenschaftliche Studien*, vol. iii., pt. 3, 1890); a monograph on the history of the curriculum of Yale College; and the important *The Confederate States of America* (1901).

SCHWABACH, shvä'bäg. A town of the Province of Middle Franconia, Bavaria, 9 miles south of Nuremberg. The Gothic Church of Saint John, dating from 1469, contains a magnificent altar-piece by Veit Stoss, and fine old paintings. The Gothic ciborium, nearly fifty feet high, is the work of A. Krafft. The market place contains a beautiful fountain built in 1617. Gold and silver wire is manufactured. The famous Schwabach needles are made here. The Schwabach Articles (1529) were the basis for the Augsburg Confession (1530). Population, in 1900, 9385.

SCHWABE, shvä'be, LUDWIG VON (1835—). A German classical philologist, born at Giessen. He became professor in the University of Tübingen. His important publications are: *Quæstiones Catullianæ* (1862); *Catullus* (1866, 1886); *De Musæo Nonni Imitatore* (1876). He was also editor of the fifth edition of Teuffel's *Geschichte der römischen Litteratur* (1890).

SCHWABENSPIEGEL, shvä'ben-shpēgel (Swabian Mirror). A mediæval German lawbook, compiled probably by an ecclesiastic of the cathedral chapter at Bamberg, about 1259. Its main source was the Sachsenspiegel (q.v.), and it attained legal authority chiefly in Swabia, Alsace, Franconia, Switzerland, and Austria. It was written in Upper-German and printed at an early period, probably at Augsberg; the first dated edition is of 1480. A thorough critical edition, by Rockinger, under the auspices of the Vienna Academy of Sciences, is in preparation.

SCHWÄBISCH HALL, shvä'bĭsh häl. A town of Germany. See HALL.

SCHWALBACH, shväl'bäk (officially called LANGEN-SCHWALBACH). A mineral spa, 13 miles by rail northwest of Wiesbaden, in Hesse-Nassau, Germany. It was a fashionable watering place in the seventeenth and eighteenth centuries, but is

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now annually visited by only 7000 persons. The waters contain iron and carbonic acid. Population, in 1900, 2677.

SCHWALBE, shväl'be, BENEDIKT. A German Benedictine monk. See CHELIDONIUS.

SCHWANN, shvän, THEODOR (1810-82). A German physiologist and histologist, born at Neuss and educated in Bonn, Würzburg, and Berlin. In the Anatomical Musem of Berlin, he assisted Johannes Müller from 1834 to 1838, and discovered pepsin, made valuable studies on artificial digestion, fermentation, and putrefaction, the organic nature of yeast, the mechanism of muscular and arterial contraction, the double direction of nerves, and the envelop of nerve fibres. In 1838-48 he was professor at Louvain, and then held a chair at Liège for another decade. Schwann made many physiological discoveries, but his most important achievement was his foundation of the modern cellular theory in *Microscopical Investigations on the Accordance in the Structure and Growth of Plants and Animals* (1839; Eng. version, 1847). He wrote "Anatomie du corps humain" for the Brussels *Encylopédie populaire* (1855).

SCHWANTHALER, shvän'tä'lēr, LUDWIG VON (1802-48). A German sculptor, born at Munich. He studied under his father, Franz Schwanthaler (1762-1820), a sculptor, and in the Munich Academy. His first royal commission was received in 1824 from King Maximilian I., an order for a silver épergne with reliefs from the myth of Prometheus. Thereafter he enjoyed a greater share of the patronage bestowed upon the art by the House of Wittelsbach. In 1826 King Louis I. sent him to Rome. Upon his return to Munich the next year, he was commissioned to execute reliefs and decorative features for the New Glyptothek. To this period, also, belong the statue of Shakespeare in the vestibule of the Royal Theatre and the Bacchus frieze (205 feet long) in Duke Max's banqueting hall. In 1832 he went again to Rome, where he executed several groups for the southern pediment of the Walhalla at Regensburg, and models for his 24 statues of painters in the New Pinakothek. In 1835 he was appointed professor at the Munich Academy. About him gathered many of the most promising young sculptors in Germany, who were of great assistance in his numerous commissions. For Louis I. he executed Homeric reliefs in the Königsbau, and twelve colossal statues of Wittelsbach princes; also the pediments of the Walhalla at Regensburg and of the Propylæum at Munich, and the colossal bronze statue of Bavaria (1844-50), nearly 63 feet high, in front of the Ruhmeshalle at Munich. Mention must be made as well of his monuments to Jean Paul (1841), at Bayreuth; to Mozart (1842), at Salzburg; and to Goethe (1843), at Frankfort; of his statues of the Grand Duke Charles Frederick of Baden (1840; Karlsruhe), the Grand Duke Louis of Hesse (Darmstadt), the Margrave Frederick Alexander of Brandenburg (1843; Erlangen), and the Emperor Rudolph of Hapsburg (1843; Speyer cathedral); and of the charming relief of two dancers, besides other figures in the palace at Wiesbaden. Consult Trautmann, *Schwanthalers Reliquien* (Munich, 1858).

SCHWARTZ, shvärts, MARIE ESPÉRANCE VON (known also as Elpis Melena) (1821-99). A German author, daughter of the Hamburg banker Brandt, born at Southgate, England. After a first early marriage she became the wife of the banker Von Schwartz, of Hamburg, from whom she eventually was separated. She then settled in Rome and devoted herself to literary work. A friendship with Garibaldi was one of the interesting features of her residence in Italy. Among her numerous works may be named: *Blätter aus dem afrikanischen Reisetagebuche einer Dame* (1849); *Garibaldis Denkwürdigkeiten* (1861); *Die Insel Kreta unter der ottomanischen Verwaltung* (1867); *Kreta-Biene, oder kretische Volkslieder, Sagen, Liebes-, Denk-, und Sittensprüche* (1874); *Garibaldi* (1884).

SCHWARTZ, MARIE SOFIA (1819-84). A Swedish novelist, born at Borås. As an author she was very popular, not only in Sweden, but also in Germany, where most of her writings were published. Her novels were frequently collected in German versions. The chief are: *Mannen of Bördoch Quinnan of Falket* (1858); *Arbetet Adlar Mannen* (1859); and *Arbetets barn*, which has been reprinted in America (1894).

SCHWARTZ, WILHELM (1821-99). A German mythologist. He was born in Berlin, studied there and in Leipzig, taught for twenty years in the Werder gymnasium in Berlin, and was director, successively, of the gymnasiums at Neuruppin (1864-72), then, until 1882, of the Friedrich-Wilhelm Gymnasium at Posen, and from 1882 until 1894 of the Luisen Gymnasium at Berlin. He wrote: *Märkische Sagen und Märchen* (1843) and *Norddeutsche Sagen* (1849), both results of early studies and travels with Adalbert Kuhn; *Ursprung der Mythologie* (1860); *Die poetischen Naturanschauungen der Griechen, Römer und Deutschen in ihrer Beziehung zur Mythologie* (1864-79); *Prähistorisch-anthropologische Studien* (1884); and *Nachklänge prähistorischen Volksglaubens im Homer* (1894).

SCHWARTZE, shvär'tse, HERMANN (1837—). A German aurist, born at Neuhof, in Pomerania, and educated in Berlin and Würzburg. He became docent in 1863, professor in 1868, and director of the aural clinic in 1884 at the University of Halle. One of the founders of modern otology, Schwartze made a particular study of the anatomy of the ear and improved the methods of paracentesis on the tympanic membrane, and of the opening of inflamed apophyses of the middle ear. He wrote *Praktische Beiträge zur Ohrenheilkunde* (1864), *Pathologische Anatomie des Ohrs* (1878), and *Lehrbuch der chirurgischen Krankheiten des Ohrs* (1885); was coëditor with Berthold of the *Handbuch der Ohrenheilkunde* (1892-93); and in 1872 became editor of the *Archiv für Ohrenheilkunde*.

SCHWARZ, shvärts, BERTHOLD. A Franciscan monk of the fourteenth century, whose name is thought to have been Konstantin Ancklitzen. He is said to have discovered gunpowder while in prison for sorcery, about 1330. It is, however, probable that gunpowder had been known before, and that Schwarz only utilized it for military purposes. There is a monument to him at Freiburg, which is assumed to be his birthplace.

SCHWARZ, HERMANN AMANDUS (1843—). A German mathematician, born at Hermsdorf, in Silesia, and educated in Berlin. He became professor at Halle in 1867, at the Zurich Polytechnic

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in 1869, at the University of Göttingen in 1875, and at Berlin in 1892. Schwarz was a follower of Weierstrass, some of whose lectures he edited under the title *Formeln und Lehrsätze zum Gebrauche der elliptischen Funktionen* (1883-85; 2d ed. 1893). His own works on minimal surfaces and the theory of functions include *Bestimmung einer speziellen Minimalfläche*, which was crowned by the Berlin Academy in 1867 and printed in 1871, and *Gesammelte mathematische Abhandlungen* (1890).

SCHWARZBURG-RUDOLSTADT, shvärts'-bōōrk rōō'dôl-stät. A principality and constituent State of the German Empire, situated in Thuringia, and consisting of several detached portions. The capital, Rudolstadt, is 18 miles south of Weimar. Total area, 363 square miles. The western and larger part belongs to the region of the Thuringian Forest, and reaches an elevation of 2900 feet. The eastern part is lower. The chief river is the Saale. Agriculture is the principal occupation. There are extensive forests in the western part, and good pasture land. The chief mineral deposits are iron, lignite, gypsum, and slate. In the western district are numerous glass and porcelain factories. Other manufactures are paper, toys, textiles, musical instruments, and flour. The Diet of the principality consists of 16 members, of whom four are elected by the highest taxed citizens and the rest by the general population for three years. The principality has one vote in the Bundesrat, and returns one member to the Reichstag. Population, in 1900, 93,059, chiefly Protestants. In this principality is the Castle of Schwarzburg, romantically situated on the Schwarza, the summer residence of the Prince.

The ruling family is one of the oldest of the Thuringian princely houses. The mediæval countship of Schwarzburg was divided at the close of the sixteenth century into the two countships of Schwarzburg-Rudolstadt and Schwarzburg-Arnstadt, the later Schwarzburg-Sondershausen. About a century later the ruling houses were elevated to the princely dignity.

SCHWARZBURG - SONDERSHAUSEN, zôn'dērs-hou'zen. A principality and constituent State of the German Empire, situated in Thuringia, and consisting of several detached districts, the main portion being inclosed within the Prussian Province of Saxony. Total area, 333 square miles. The Thuringian Forest covers part of the principality. The soil is mostly fertile, and agriculture is the principal industry. The forests are also important. There are numerous small porcelain factories, glass works, machine works, paint factories, tanneries, shoe factories, and sugar mills. The Constitution of the principality, dating from 1857, provides for a Diet of 15 members, of whom five are appointed by the Prince, five are elected by the highest taxed citizens, and five by the inhabitants in general, for a term of four years. The principality has one vote in the Bundesrat and returns one Deputy to the Reichstag. Population, in 1890, 75,510; in 1900, 80,898, principally Protestants. The capital is Sondershausen (q.v.); the largest town is Arnstadt. For history, see SCHWARZBURG-RUDOLSTADT.

SCHWARZENBERG, shvärts'en-bĕrk. A princely family, originally of Franconia, but later of Austria. About 1420 ERKINGER VON SEINSHEIM purchased the lordship of Schwarzenberg in Franconia, and in 1429 he was made a baron of the Empire by the Emperor Sigismund. Several of this family have been prominent in European affairs. The most notable are: (1) ADAM, Count of Schwarzenberg, was born in 1584, and became a privy councilor of George William, Elector of Brandenburg. He was largely responsible for the vacillating policy of Brandenburg during the Thirty Years' War, a course most unfortunate in its results, and for this he was punished after the accession of the Great Elector, in 1640, by imprisonment in the fortress of Spandau, where he died March 14, 1641. (2) KARL PHILIPP, Prince of Schwarzenberg. He was born at Vienna, April 15, 1771, served against the Turks, and rose to the grade of lieutenant field-marshal in 1799. He commanded a division under Mack in the campaign of 1805, and took part in the battle of Austerlitz. He was appointed Ambassador at the Russian Court in 1808, by the express wish of the Emperor Alexander; fought at Wagram in 1809; and after the Treaty of Schönbrunn conducted the negotiations preliminary to the marriage of the Archduchess Maria Louisa to Napoleon. Both in this capacity and as Ambassador at Paris he gained the esteem of Napoleon, and the latter expressly demanded for him the post of General-in-Chief of the Austrian contingent of 30,000 men which had been sent to aid France against Russia in 1812. Schwarzenberg with his little army entered Russia from Galicia, crossed the Bug, and achieved some slight successes, but was afterward driven into the Grand Duchy of Warsaw, and took up a position at Paltusk, where he concluded with the Russians an armistice which secured the French retreat. Schwarzenberg was much blamed for his dilatory conduct at the time; but Napoleon concealed any dissatisfaction he might have felt, and demanded for him from the Austrian Government the baton of field-marshal. After a brief sojourn at Paris, in April, 1813, Schwarzenberg was appointed to the command of the Austrian army of observation in Bohemia; and when Austria joined the allied powers, he became generalissimo of the armies of the coalition, was defeated by Napoleon at Dresden, but the united army under him gained the great victory of Leipzig. His dilatory tactics during the pursuit of the French across Germany and after the crossing of the Rhine was regarded with extreme dissatisfaction by men of the type of Blücher and Gneisenau, who were anxious to strike a decisive blow at the heart of the enemy. On the return of Napoleon from Elba, he obtained the command of the allied army on the Upper Rhine, and a second time entered France. On his return to Vienna he was made president of the Imperial Council for War. He died of apoplexy at Leipzig, October 15, 1820. Consult Prokesch-Osten, *Denkwürdigkeiten aus dem Leben des Feldmarschalls Fürsten Schwarzenberg* (Vienna, 1822). (3) His nephew, FELIX, an Austrian statesman, was born October 2, 1800, at Krumau, Bohemia. He entered the army, became military attaché of the Austrian embassy at Saint Petersburg in 1824, and afterwards held several diplomatic appointments. He was envoy to Naples when the revolution of 1848 broke out. He took the field in Upper Italy as a brigade commander, and soon after was made a lieutenant field-marshal. He was called to the head

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of the Government in Vienna in November, 1848, opposed the German nationalist plans advocated at Frankfort, obtained the aid of Russia to suppress the Hungarian rising, and followed the policy of Metternich in opposing Prussia. He died in Vienna April 5, 1852. Consult Berger, *Leben des Fürsten Felix zu Schwarzenberg* (Leipzig, 1853; Vienna, 1881).

SCHWARZWALD, shvärts'vält. The German name of the Black Forest (q.v.).

SCHWATKA, shwŏt'kȧ, FREDERICK (1849-92). An American explorer, born at Galena, Ill. He graduated at West Point in 1871, was commissioned second lieutenant, and served on garrison and frontier duty until 1877. During his army life he studied both law and medicine, was admitted to the Nebraska bar in 1875, and received his medical degree in New York in 1876. In 1878 he obtained leave of absence from the War Department, and conducted, with W. H. Gilder, the final land search for traces of the Franklin expedition. Wintering (1878-79) among the Eskimos near Chesterfield Inlet, Hudson Bay, he set out in April, 1879, with four whites, fourteen Eskimos, and abundant ammunition, for the northern edge of the continent. He explored minutely the continental coast line to Point Seaforth, crossed Simpson Strait to King William Land, and thoroughly searched the region traversed by Franklin's retreating party. During three months on King William Land Schwatka found four despoiled graves, six unburied skeletons, and many relics of the ill-fated expedition. The journey was one of the most remarkable in the history of Arctic sledging and made Schwatka famous. In the 355 days during which he was absent from his base of supplies he traveled 2819 geographical miles, depending for food upon the game he killed. In 1883 he explored the course of the Yukon River, Alaska. He resigned his commission in the army in 1885, and in the following year made an unsuccessful attempt to ascend Mount Saint Elias. In 1889 he engaged in exploring work in Mexico. He received the Roquette Arctic Medal from the Geographical Society of Paris, and the medal of the Imperial Geographical Society of Russia. His great Arctic journey was described by Colonel Gilder in *Schwatka's Search* (New York, 1881); also in *The Franklin Search, Under Lieutenant Schwatka* (1881). His own writings were *Along Alaska's Great River* (1885); *Nimrod in the North* (1885); *Children of the Cold* (1886); and many articles contributed to geographical and other publications.

SCHWEGLER, shvāk'lĕr, ALBERT (1819-57). A German theologian and writer on the history of philosophy. He was born at Michelbach, in Württemberg, studied theology at the University of Tübingen, and was appointed professor there of classical philology in 1848. In theology and criticism he was of the 'Tübingen school.' In 1844 he started the *Jahrbücher der Gegenwart*. He published an annotated edition and translation of Aristotle's *Metaphysics* (1844-48); *Der Montanismus und die christliche Kirche des zweiten Jahrhunderts* (1841); *Das nach-apostolische Zeitalter* (1846); *Geschichte der Philosophie* (1848; Eng. trans. by J. H. Seelye, New York, 1856, and by J. H. Stirling, London, 2d ed., 1868); *Römische Geschichte* (1853-58; 2d ed. 1867-73). His *Geschichte der griechischen Philosophie* was published after his death (1859).

SCHWEIDNITZ, shvīd'nĭts. A town in the Province of Silesia, Prussia, on the Weistritz, 31 miles southwest of Breslau (Map: Prussia, G 3). Its ancient fortifications have been replaced by promenades. The manufactures include woolens, leather, machinery, furniture, gloves, cigars, and organs. There are important cattle and grain markets. Schweidnitz was founded in the eleventh century, and received municipal privileges in 1250. It was formerly the capital of the Principality of Schweidnitz. Population, in 1900, 28,432.

SCHWEIGER-LERCHENFELD, lĕr'kenfĕlt, AMAND, Baron von (1846—). An Austrian traveler and writer, born in Vienna. He served in the army from 1865 to 1871, then set out on extensive travels, which he described in numerous popular works, and made Vienna his usual residence. A partial list of his writings includes: *Unter dem Halbmond* (1876); *Bosnien* (2d ed. 1879); *Serail und Hohe Pforte* (anon., 1879); *Das Frauenleben der Erde* (1881); *Der Orient* (1882); *Griechenland in Wort und Bild* (1882); *Das eiserne Jahrhundert* (1883); *Von Ozean zu Ozean* (1884); *Die Araber der Gegenwart* (1885); *Das Mittelmeer* (1888); *Die Erde in Karten und Bildern* (1889); *Unterwegs*, traveling pictures (1891-95); *Die Donau* (1895); *Im Lande der Cyclopen* (1899); *Das neue Buch von der Weltpost* (1901).

SCHWEIGGER, shvī'gĕr, JOHANN SALOMO CHRISTOPH (1779-1857). A German physicist, born and educated in Erlangen. There he became docent in 1800, and, after teaching at Bayreuth (1803-11), and at the Nuremberg Polytechnic, returned to Erlangen as professor of physics and chemistry in 1817. Two years later he went to Halle. Schweigger devised an electrometer in 1808, and in 1820 invented the glavanometer (q.v.), in which he made use of Oersted's discovery of the effect of a current in a magnetic needle by surrounding the latter with a number of turns of the wire carrying the current. He founded the *Journal für Chemie und Physik*.

SCHWEIGGER, KARL (1830—). A German ophthalmologist, son of the preceding. He was born in Halle, studied there, at Erlangen, and Würzburg, and went to Berlin as assistant to Gräfe (1858-65). From 1868 to 1871 he was professor in Göttingen, and then succeeded Gräfe in Berlin. He edited the *Archiv für Augenheilkunde* (1881 et seq.), published a chart of optical tests (1876; 3d ed. 1895), and wrote a *Handbuch der speziellen Augenheilkunde* (1871), which passed through several editions.

SCHWEINFURT, shvīn'fōōrt. A town in Lower Franconia, Bavaria, on the Main, 28 miles by rail northeast of Würzburg (Map: Germany, D 3). The sixteenth-century town hall contains a library and a museum of history and art. Schweinfurt is noted for its manufactures of dyes, including the well-known Schweinfurt green. Machinery, ball-bearings, engines, shoes, sugar, and tobacco are among its numerous products. There are important cattle, sheep, and swine markets. Schweinfurt, first mentioned in 791, became a free Imperial city in the twelfth century. It passed to Bavaria in 1803. Population, in 1900, 15,295.

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SCHWEINFURTH, shvīn'fōōrt, GEORG (1836—). A German explorer, born at Riga. He studied natural history, particularly botany, at the universities of Heidelberg, Munich, and Berlin, and in 1864 went to Egypt, where he spent two years. In 1869 he set out from Khartum to explore the countries along the White Nile. In 1872, on a commission from the Khedive, he founded the Institut Egyptien at Cairo, and in 1874 he visited the principal oases in the Libyan desert. During the following years he several times visited the oases of Arabia, of whose flora he made a thorough study, and explored the coast of Barca and the valley of the Nile. In 1888 he returned to Europe and took up his residence in Berlin. In 1901-02 he visited Egypt again, returning with rich archæological and botanical collections. Among his publications are *The Heart of Africa* (1874) and *Artes Africanæ* (1875). In collaboration with Ratzel he also published *Emin Pascha, Reisebriefe und Berichte* (1888).

SCHWEINFURTHERS. See CHURCH TRIUMPHANT, THE.

SCHWEINITZ, shvī'nīts, EDMUND ALEXANDER DE (1825-87). An American bishop of the Moravian Church. He was born at Bethlehem, Pa., and studied theology at the Moravian Seminary there and at Berlin. He entered the ministry in 1850, and in the course of his pastoral life was stationed at Canal Dover, O.; Lebanon, Pa.; Philadelphia, Lititz, and Bethlehem, in Pennsylvania. In 1870 he was consecrated bishop of the Moravian Church. The latter years of his life were spent at Bethlehem, where he held the presidency of the seminary, and also the presidency of the governing board of the American Province of the Unitas Fratrum. He founded *The Moravian*, the weekly journal of his Church, in 1856, and for ten years was its editor. He was the author of *The Moravian Manual* (1859); *The Moravian Episcopate* (1865); *The Life and Times of David Zeisberger* (1870); *Some of the Fathers of the Moravian Church* (1881); and *The History of the Church Known as the Unitas Fratrum; or, The Unity of the Brethren, founded by the followers of John Huss* (1885). Consult his *Memoir* (Bethlehem, 1888).

SCHWEINITZ, EMIL ALEXANDER DE (1866-1904). An American bacteriologist, born at Salem, N. C. He graduated at the University of North Carolina in 1882 and at Göttingen in 1886, became connected with the chemical division of the Agricultural Department, Washington, D. C., and in 1890 was appointed director of the biochemic laboratory of the Bureau of Animal Industry of that department. He was also appointed to the chair of chemistry and toxicology in the Columbian University. He made an especial study of hygiene and of bacterial products, and published *The Poisons Produced by the Hog Cholera Germ* (1890), *The Production of Immunity to Swine Plague by Use of the Products of the Germ* (1891). *A Hygienic study of Oleomargarine* (1896), *The War with the Microbes* (1897), and other scientific treatises.

SCHWEINITZ, GEORGE EDMUND DE (1858—). An American ophthalmologist, son of the Moravian bishop, born in Philadelphia, and educated at Bethlehem Moravian College and in the University of Pennsylvania (class of 1881). He was prosector (1883-88) and lecturer on ophthalmology (1891-92) in the university, and professor in the Philadelphia Polyclinic and in Jefferson Medical College (1891-92). He wrote *Diseases of the Eye* (1892), and contributed to the *American System of Obstetrics* (1889), to the *Cyclopædia of Diseases of Children* (1890), and to the *System of Therapeutics* (1892).

SCHWEINITZ, LOUIS DAVID VON (1780-1834). An American botanist, born at Bethlehem, Pa. He studied in Germany, entered the ministry of the Moravian Church, and held ecclesiastical office at Salem, N. C., and Bethlehem. By his botanical researches he added to the list of American flora more than 1400 species, of which more than 1200 were fungi. He bequeathed to the Academy of Natural Sciences of Philadelphia his herbarium, at the time of his death the largest private collection in the United States. His works include a *Conspectus Fungorum Lusatiæ* (1805), *Specimen Floræ Americæ Septentrionalis Cryptogamieæ* (1821), and a *Synopsis Fungorum in America Boreali Media Degentium* (1832). See the *Memoir*, published at Philadelphia in 1835.

SCHWEINITZ, RUDOLF (1839-96). A German sculptor, born at Charlottenburg. He studied at the Berlin Academy under Schievelbein, and after further training in Paris, Copenhagen, and Rome became his master's assistant. He worked on the exterior decoration of the National Gallery in Berlin, for which he designed the three arts for the three corners of the gables. He made the three colossal groups "Rhine," "Oder," and "Battle," for the King's Bridge in Berlin; eight reliefs on the City Hall, Berlin, and the reliefs on the Weichsel Bridge in Thorn, "Founding of the City of Thorn;" also ten statues in Bläser's monument to Frederick William III. in Cologne. His "Cupid in Danger" (1881) is in the National Gallery, Berlin.

SCHWELM, shvĕlm. A town of Prussia, 23 miles east of Düsseldorf. There are iron, wire, enamel, and nickel works, with manufactures of wood screws, machinery, locks and keys, linens, and silks. Population, in 1900, 16,890.

SCHWENDENER, shvĕn'de-nĕr, SIMON (1829—). A German botanist, born at Buchs, Switzerland, and educated at Geneva and Zurich. He became professor and director of the botanical gardens at Basel in 1867, and professor of physiological botany at Berlin in 1878. He maintained that lichens were composed of algal cells, white cellular tissue, and spongy fungus, and explained the formation and development of plants by laws of mechanics. He wrote *Ueber den Bau und das Wachstum des Flechtenthallus* (1860), *Die Algentypen der Flechtengonidien* (1869), *Das mechanische Prinzip im anatomischen Bau der Monokotylen* (1874), *Die mechanische Theorie der Blattstellungen* (1878), *Ueber das Winden der Pflanzen* (1881), *Zur Theorie der Blattstellungen* (1883), and *Gesammelte botanische Mitteilungen* (1898).

SCHWENINGER, shvā'nīng-ĕr, ERNST (1850—). A German physician, born in Freistadt. He studied medicine at Munich (1866-70), was Buhl's assistant until 1875, when he became docent of pathological anatomy, and in 1879 went into private practice. His appointment to a chair in Berlin, in 1884, was largely due to his successful treatment of Bismarck for obesity. His modified Banting method is de-

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scribed by Maas, *Die Schweninger-Kur* (21st ed., 1889). Among his writings are *Dem Andenken Bismarcks* (1899) and *Gesammelte Arbeiten* (1886).

SCHWENKFELD, shvĕnk'fĕlt, KASPAR VON (c.1490-1561). A German religious reformer. He was born at Ossig, in Silesia, was educated at Liegnitz and Cologne, and became a councilor at the Court of the Duke of Liegnitz. He was an enthusiastic advocate of the Reformation, and it was mainly through his influence that it gained a footing in Silesia. His views differed materially from those of Luther, however, and he became separated from the other reformers and was regarded by them with suspicion and dislike. When the Lutheran principles became dominant in Silesia, Schwenkfeld voluntarily left the country in 1529 and thenceforth was driven from town to town, and finally died at Ulm. Schwenkfeld laid special stress upon the primary importance of a renewal of the inner life, to which all questions of outer concern should be subsidiary, and held that the Scriptures are dead without the indwelling word and that the organization of the Reformed Church should grow spontaneously out of the renewed inner life. The humanity of Christ he believed to be progressive through its union with the divine nature, so that it partakes more and more of that nature without losing its identity. The Lord's Supper he taught was a sacrament of spiritual nourishment without change in the elements. Although never ordained, he preached often and with great effect, and had many sympathizers. His writings were numerous, and, when the printing press was forbidden, were circulated in manuscript. His *Grosse Confession* (1540-47) contains the best presentation of his doctrine. Consult: Kadelbach, *Ausführliche Geschichte Kaspar von Schwenkfelds und der Schwenkfelder in Schlesien, der Ober-Lausitz und Amerika* (Lauban, 1860); Hoffmann, *Kaspar Schwenkfelds Leben und Lehren* (Berlin, 1897). See SCHWENKFELDIANS.

SCHWENKFELDIANS, or **SCHWENKFELDERS**. The followers of Kaspar von Schwenkfeld (q.v.). Although, consistently with his principles, Schwenkfeld founded no Church, and after his death an ecclesiastical organization was out of the question for his sympathizers, owing to the conditions of the times, nevertheless they held meetings and congregations came into existence in different parts of Germany, particularly in Silesia, as well as in Switzerland and Italy. They suffered much persecution and many left their homes in consequence. In 1734 thirty-four families emigrated from Silesia to Pennsylvania and settled in Montgomery and Berks counties, and others followed two years later. A school system was established in 1764, and a denominational organization was established in 1782. In 1901 they had three districts, seven church buildings, five ministers, and about six hundred members. Their numbers have been diminished by migration to the West, where they became members of other denominations. Their Church government is congregational, the services are non-liturgical, and they have a rich hymnody. A common benevolent fund is maintained. In addition to the more important festivals of the Christian year, they observe the anniversary of the landing of the first company at Philadelphia (September 24th), as the *Gedächtnisstag*. They have published a number of doctrinal and institutional books. In Europe the Schwenkfeldians have become extinct. Consult the works mentioned in the notice of the founder.

SCHWERIN, shvâ-rēn'. The capital of the Grand Duchy of Mecklenburg-Schwerin, Germany, beautifully situated on Lake Schwerin, and several smaller lakes, about 38 miles southeast of Lübeck (Map: Prussia, D 2). The town is well built, and has handsome churches. The fourteenth-century Gothic cathedral is an interesting brick edifice, restored in 1867-69. It contains the tombs of the grand ducal family. Near the cathedral is the Grand Ducal Library of 160,000 volumes. On an island in Lake Schwerin is the beautiful grand ducal palace, an early Renaissance edifice, completed in 1857. The grand ducal museum contains a picture gallery, with noteworthy works by German, Flemish, Dutch, and Italian masters. Other interesting features are the Government offices, the arsenal, the Court theatre and the gymnasium. The principal manufactures are musical instruments (especially pianos), wagons, machinery, dyes, furniture, cabinets, and bricks. Schwerin, of Slavic origin, and the oldest town in Mecklenburg, is first mentioned in 1018, and received municipal privileges in 1161. Population, in 1890, 33,643; in 1900, 38,667.

SCHWERIN, KURT CHRISTOPH, Count (1684-1757). A Swedish soldier, born at Löwitz, Pomerania. He entered the Dutch army as ensign in 1700, fought in the War of the Spanish Succession, and in 1706 became first lieutenant in the service of the Duke of Mecklenburg. He then entered the Prussian service, and Frederick William I. sent him on several diplomatic missions. Frederick II. made him a count and field-marshal. In the first Silesian war he commanded a part of the Prussian army and won the battle of Mollwitz in 1741. He stormed Prague in the second Silesian war and was killed during the battle of Prague in the Seven Years' War. Consult Varnhagen von Ense, *Biographische Denkmale* (Leipzig, 1873).

SCHWERTE, shvĕr'te. A town of the Province of Westphalia, Prussia, 53 miles by rail northeast of Cologne. There is a Romanesque church with a carved altar and some good fourteenth-century stained glass. The iron works and machine shops are extensive. Population, in 1900, 12,261.

SCHWICKER, shvĭk'ĕr, JOHANN HEINRICH (1839-1902). An Austrian historian, born in New Beschenowa and educated to be a teacher. His works deal especially with the history, literature, and ethnology of Hungary, the more important titles being *Die Deutschen in Ungarn und Siebenbürgen* (1881), *Die Zigeuner in Ungarn und Siebenbürgen* (1883), *Das Königreich Ungarn* (1886), a biography of Pazman (1888), and the valuable *Geschichte der ungarischen Litteratur* (1889).

SCHWIND, shvĭnt, MORITZ VON (1804-71). A German historical painter and draughtsman, born in Vienna. He studied at the Vienna Academy, and under Ludwig Schnorr. At the Academy of Munich, to which he went in 1828, Cornelius exercised a powerful influence upon him. In

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Munich he decorated in encaustic a room in the palace (1832-34) and painted sixty water-color designs, from the life of Charlemagne, for Hohenschwangau Castle. After several years in Rome he was called to Karlsruhe to decorate the new Kunsthalle, and there also executed allegorical compositions for the session-room of the Upper Chamber, and in oil "Knight Kurt's Bridal Procession" (1838, Karlsruhe Gallery). In 1844 he removed to Frankfort, where he painted for the Städel Institute "The Singers' Contest at the Wartburg" (1846), and thence went to Munich in 1847, as professor at the Academy. In the Wartburg he painted in 1853-56 frescoes illustrative of the life of Saint Elizabeth, of the history of the first landgraves, and of the Singers' Contest. In 1859 he designed thirty-four cartoons for windows in Glasgow Cathedral, and in 1864 ten for a window in Saint Michael's, London.

Schwind's works show great idyllic and poetic feeling, and it has often been remarked that his three great aquarelle cycles, "Cinderella" (1854), "The Seven Ravens" (1858, Weimar Museum), and "The Beautiful Melusina" (1870, Vienna Museum), glorify the virtues and heroism of women. Technically he was essentially 'old German,' and he ranks as a great Romanticist. Besides those already mentioned, his works in oil include "The Wedding Journey," "Count Gleichen Returning from the Crusades," and sixteen others (Schack Gallery, Munich); "Father Rhine" (Raczynski Gallery, Berlin); "The Rose" (1847, National Gallery, Berlin); and "A Symphony" after Beethoven (1849, New Pinakothek, Munich). In 1866-68 he executed a cycle in fresco from the "Magic Flute," in the Loggia, and sixteen operatic scenes in tempera, in the foyer of the Opera House at Vienna. Besides some clever etchings there are unnumbered ingenious and humorous designs of all kinds to his credit. For his biography, consult Lukas von Führich (Leipzig, 1871), Holland (Stuttgart, 1873), and Haack (Bielefeld, 1898).

SCHWOB, shwŏb, Mayer André Marcel (1867-1905). A French author, born at Chaville. He studied at Nantes and passed his *licence ès lettres* in 1888. Between 1891 and 1900 he wrote some rather unusual stories and novels, such as *Cœur double, Le Roi au mosque d'or, Le livre de Monelle, Mimes, La porte des rêves.* In 1894 he published a translation of Defoe's *Moll Flanders,* and in 1898, with Eugène Morand, translated Hamlet for Mme. Sarah Bernhardt. The intention was to translate both the lines and atmosphere of the play, but the attempt was not successful. He made exhaustive studies in the life and times of Villon, gaining recognition as one of the first authorities on the subject, and in 1902 collaborated with F. Marion Crawford in a play, *Francesca de Rimini.*

SCHWYZ, shvĭts. One of the forest cantons of Switzerland, separated by the Lake of Zurich on the north from the cantons of Zurich and Saint Gall, and bounded by the Canton of Glarus on the east, Uri and Lake Lucerne on the south, and Lucerne and Zug on the west (Map: Switzerland, C 1). Area, 351 square miles. Schwyz belongs wholly to the region of the Lower Alps. A central ridge having a maximum altitude of 7594 feet forms a divide between the watersheds of Lakes Lucerne and Zurich. On either side there are numerous branching spurs inclosing the valley of the Sihl on the north and that of the Muota on the south. From the latter rise the outliers of the Urner and Glarner Alps.

Schwyz is essentially a pastoral region; stock-raising is the principal occupation. The supply of cereals is far below the domestic demand, and viticulture is on a limited scale. The forests cover nearly one-fourth of the area. Marble and gypsum are found. The principal manufacturing industry is cotton-spinning. Silk-weaving is developed to some extent as a house industry. The economic life of the canton is aided by the heavy annual pilgrimage to Einsiedeln (q.v.).

The legislative assembly (Grosser Rat) is elected for four years at the rate of one member to every 600 inhabitants. The executive council consists of 7 members elected by the people for four years. Proportional representation for election to the legislature prevails in all communities entitled to 3 or more members. The obligatory referendum and the initiative are in force. Population, in 1900, 55,385, almost entirely Roman Catholic. German is mostly spoken.

Schwyz, which gives its name to Switzerland, was in early mediæval times a free community tenacious of its rights, and frequently embroiled over pastoral privileges with the powerful Abbey of Einsiedeln, which eventually came under its protection. With Uri and Unterwalden it formed in 1291 the celebrated league of resistance against Austria, and defeated the Austrian forces at Morgarten Pass in 1315 and at Sempach in 1386. The second victory insured the independence of the Schwyzers and they subsequently extended the authority of the "Landsgemeinde" over a considerable territory. They strenuously opposed the Reformation as members of the league formed to inaugurate the Counter-Reformation. In 1798 they spiritedly resisted the French, but suffered severely during the French campaign against the Russians in Switzerland in 1799. Schwyz remained stanchly conservative against constitutional changes and became a member of the Sonderbund, sharing in the defeat of the Catholic cantons in the war of 1847, which was followed by a revision of the Constitution.

SCHWYZ. The capital of the Canton of Schwyz, in Switzerland, situated in a deep basin formed by the Myten, the Rigi, and the Fronalpstock, about 10 miles southwest of Einsiedeln (Map: Switzerland, C 1). Its town hall, embellished with frescoes and portraits, and the parish church possess interest. Population, in 1900, 7398.

SCHYNSE, shĭn'se, August (1857-91). A German Catholic missionary and African explorer, born at Wallhausen and educated at Bonn. He attended the seminary at Speyer, became a priest in 1880, and in 1882 entered the service of the African Mission and was active in the work in Algeria. After his return to Europe he taught at the mission houses of Lille and Brussels. He was one of a mission expedition to the Congo in 1855. This trip he described in his diary, *Zwei Jahre am Kongo* (1889). In 1888 he made a trip to East Africa and from there accompanied Stanley and Emin Pasha to the coast. With Emin he went to the Victoria Nyanza and then spent almost a year in explorations between that lake and Uganda. He wrote *Mit Stanley und Emin Pascha durch Deutsch Ost-Afrika* (1890). Consult: Hespers,

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Pater Schynses letzte Reisen (*Cologne*, 1892), and *Pater August Schynse und seine Missionsreisen in Afrika* (Strassburg, 1894).

SCIACCA, shâk'kâ. A seaport in the Province of Girgenti, Sicily, 45 miles south-southwest of Palermo (Map: Italy, H 10). It has an eleventh-century cathedral, ruins of castles, a technical school, and a library. There are potteries, anchovy fishing, and a trade in grain and oil. Sciacca was an important city in the Middle Ages. Population (commune), in 1881, 22,-195; in 1901, 20,090.

SCIÆNIDÆ, sī-ĕn'ĭ-dē (Neo-Lat. nom. pl., from Lat. *sciæna*, from Gk. *σκίαινα*, *skiaina*, sort of sea-fish, maigre, from *σκιά*, *skia*, Skt. *chāyā* shadow). A large and important family of spiny-rayed fishes, the grunters, with considerable resemblance to the perches, having a compressed body. The scales are ctenoid and arranged in oblique rows. The family includes the weakfish, drums, croakers, etc. There are 30 genera and about 150 species, found in all warm seas, but never in deep water. A few species are restricted to fresh waters. Many grow to a large size. Most of them are valued as food fishes and some are interesting game fishes.

SCIALOIA, shē-â-lō'yâ, ANTONIO (1817-77). An Italian economist and patriot, born at San Giovanni del Teduccio, in Campania. Educated for the law, he published in 1840 *I principi dell' economia sociale*, a book which at once put the young writer into the notice of European economists. As a consequence he was professor of political economy at the University of Turin. He became actively interested in the movements which resulted in the unification of Italy. He was called into the Treasury by Cavour, entered the Lower House of Parliament, and later became Senator. He held the portfolio of Finance from 1865 to 1867, at the most trying epoch of Italian affairs. Among his economic and legal works may be mentioned, in addition to the *Principi* already named, *Sulla proprietà dei prodotti d'ingegno* (1843), *Industria e protezione* (1843), *I bilanci di Napoli e degli stati sardi*, and *Carestia e governo* (published in Turin from 1854 to 1860).

SCIATICA (ML., from *sciaticus*, from Lat. *ischiadicus*, from Gk. *ἰσχιαδικός*, *ischiadikos*, subject to pains in the loins, from *ἰσχιάς*, *ischias*, pain in the loins, from *ἰσχίον*, *ischion*, socket of the thigh joint). A neuralgia of the great sciatic nerve. (See NERVOUS SYSTEM AND BRAIN.) It occurs in persons of a gouty or rheumatic tendency and is brought on by exposure, muscular strain from hard labor, pressure from hard seats, and constipation. As a symptomatic affection it may be caused by the pressure of pelvic tumors, injury to the nerves, inflammations, and spinal disease. It also occurs occasionally in phthisis and diabetes. Sciatica is characterized by irregular pains about the hip, especially between the great trochanter of the thigh bone and the bony process on which the body rests when sitting (tuberosity of the ischium), spreading into the neighboring parts and running down the back of the thigh into the leg and foot. The pain is almost continuous, with paroxysms of great severity in which the pain is sharp, burning, and stabbing in character. The disease is very obstinate and tends to become chronic. In treatment a most important indication is rest, which is sometimes made more complete by the application of a splint to the limb. The medicinal treatment depends upon the underlying constitutional condition, with morphine, antipyrine, and like drugs to relieve pain. When the disease becomes chronic the galvanic electric current is indicated. Wet cupping is often useful.

SCICLI, shē'klē. A town in the Province of Syracuse, Sicily, 38 miles southwest of Syracuse (Map: Italy, J 11). Population (commune), in 1901, 16,277.

SCID'MORE, ELIZA RUHAMAH (1856—). An American traveler and author. She was born at Madison, Wis., received an academic education, became widely known as a traveler and as a writer of books of travel, and was made corresponding secretary of the National Geographic Society. Her published works include: *Alaska, the Southern Coast and the Sitkan Archipelago* (1885); *Jinrikisha Days in Japan* (1890); *Westward to the Far East* (1890); *Java, the Garden of the East* (1897); and *China, the Long-Lived Empire* (1900).

SCIENCE, SOCIAL. See SOCIOLOGY.

SCIENCES (Lat. *scientia*, knowledge, from *scire*, to know), CLASSIFICATION OF. From early times attempts have been made to arrange all the sciences in a systematic order which shall clearly show their relations to each other. The result of such an attempt depends, of course, partly upon the material to be classified, and partly upon the principle used in classification, i.e. the *fundamentum divisionis* (see DIVISION); it is also apt to be influenced by the partiality of the classifier in favor of some discipline which he wishes to place above all others.

In ancient Greece there were relatively few sciences, and the classification of such as existed was a comparatively easy matter. And yet even then there was disagreement among classifiers, due in great measure to differences in philosophical conceptions. The Platonists divided the sciences into dialectics, physics, and ethics. Aristotle divided them into the theoretical, the practical, and the poetical (creative or technical). Interpreters are not agreed upon what he accepted definitively as the sub-classes of the theoretical sciences. Some maintain that these subclasses are analytics (logic), metaphysics, and physics. Others say that he regarded logic merely as propædeutic to the sciences, and that the theoretical sciences were divided into mathematics, physics, and the 'first philosophy' (metaphysics). The practical sciences included ethics and politics, although Aristotle seemed at times to regard ethics merely as a branch of politics. The technical sciences were of two kinds, the useful and the imitative.

In modern times Bacon (1605) uses as principle of division the so-called faculties of the mind, some one of which was by him supposed to be predominantly active in each of the several sciences. These faculties were memory, imagination, and reason, and they gave rise respectively to history, poesy, and philosophy. "History is natural, civil, ecclesiastical, and literary; whereof the first three I allow as extant, the fourth I note as deficient." These are again subdivided. Poesy is divided into "poesy narrative, representative, and allusive." "In philosophy, the contemplations of man do either penetrate unto God, or are circumferred to Nature, or are reflected or reverted upon himself. Out of which

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HOBBES'S CLASSIFICATION OF THE SCIENCES

- SCIENCE, that is, knowledge of consequences; which is called also PHILOSOPHY.
  - Consequences from the accidents of bodies naturall; which is called NATURALL PHILOSOPHY.
    - Consequences from the accident common to all bodies naturall; which are *Quantity* and *Motion*.
      - Consequences from quantity and motion *indeterminate;* which being the principles, or first foundation of Philosophy, is called *Philosophia Prima*. — PHILOSOPHIA PRIMA.
      - Consequences from motion, and quantity *determined*.
        - Consequences from quantity, and motion determined
          - By figure.
          - By number.
          - *Mathematiques.* — GEOMETRY. ARITHMETIQUE.
        - Consequences from the motion, and quantity of bodies in *speciall*.
          - Consequences from the motion, and quantity of the great parts of the world, as the *Earth* and *Starres*. — *Cosmography.* — ASTRONOMY. GEOGRAPHY.
          - Consequences from the motion of speciall kinds, and figures of body.
            - *Mechaniques.* — SCIENCE OF ENGINEERS. ARCHITECTURE. NAVIGATION.
            - Doctrine of *weight*.
    - PHYSIQUES, or consequences from *Qualities*.
      - Consequences from the qualities of bodies *Transient*, such as sometimes appear, sometimes vanish. — METEOROLOGY.
      - Consequences from the qualities of bodies *Permanent*.
        - Consequences from the qualities of the *Starres*.
          - Consequences from the *Light* of the starres. Out of this, and the motion of the sunne, is made the Science of — SCIOGRAPHY.
          - Consequences from the *Influence* of the Starres.. — ASTROLOGY.
        - Consequences of the qualities from *Liquid* bodies that fill the space between the starres; such as are the *Ayre*, or substance aetheriall.
        - Consequences from the qualities of bodies *Terrestriall*.
          - Consequences from the parts of the earth, that are *without Sense*.
            - Consequences from the qualities of *Minerals*, as *Stones*, *Metalls*, etc.
            - Consequences from the qualities of *Vegetables*.
          - Consequences from the qualities of *Animals*.
            - Consequences from the qualities of *Animals in generall*.
              - Consequences from vision — OPTIQUES.
              - Consequences from sounds..... — MUSIQUE.
              - Consequences from the rest of the senses.
            - Consequences from the qualities of *Men in speciall*.
              - Consequences from the *Passions* of men..... — ETHIQUES.
              - Consequences from *speech*.
                - In *Magnifying*, *Vilifying*, etc. ..... — POETRY.
                - In *Perswading*..... — RHETORIQUE.
                - In *Reasoning*..... — LOGIQUE.
                - In *Contracting*..... — THE *Science* of JUST and UNJUST.
  - Consequences from the accidents of *Politique* bodies; which is called POLITIQUES, and CIVILL PHILOSOPHY.
    - 1. Of consequences from the *Institution* of COMMONWEALTHS, to the *Rights* and *Duties* of the *Body Politique*, or *Soveraign*.
    - 2. Of consequences from the same, to the *Duty* and *Right* of the *Subject*.

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SPENCER'S CLASSIFICATION OF THE SCIENCES (I.)

- **I. ABSTRACT SCIENCE.**
  - Universal law of relation—an expression of the truth that uniformities of connection obtain among modes of Being, irrespective of any specification of the natures of the uniformities of connection.
  - Laws of relations
    - that are qualitative or that are specified in their natures as relations of coincidence or proximity in Time and Space, but not necessarily in their terms; the natures and amount of which are indifferent. (LOGIC.)
    - that are quantitative (MATHEMATICS.)
      - negatively: in terms of the relations being definitely related sets of positions in space; and the facts predicated being the absences of certain quantities. (*Geometry of Position.*)
      - positively, the terms being magnitudes composed of
        - units that are equal only as having independent existences. (*Indefinite Calculus.*)
        - equal units
          - the equality of which is not defined as extensive, protensive, or intensive. (*Definite Calculus.*)
            - When their numbers are completely specified. (*Arithmetic.*)
            - When their numbers are specified only
              - in their relations. (*Algebra.*)
              - in the relations of these relations. (*Calculus of Operations.*)
          - the equality of which is that of extension.
            - Considered in their relations of co-existence. (*Geometry.*)
            - Considered as traversed in time
              - that is wholly indefinite. (*Kinematics.*)
              - that is divided into equal units. (*Geometry of Motion.*)

- **II. ABSTRACT-CONCRETE SCIENCE.**
  - Universal laws of forces (tensions and pressures) as deducible from the persistence of force: the theorems of resolution and composition of forces.
  - Laws of forces as manifested by matter
    - in masses (MECHANICS.)
      - that are in equilibrium relatively to adjacent masses
        - and are solid. (*Statics.*)
        - and are fluid. (*Hydrostatics.*)
      - that are not in equilibrum relatively to adjacent masses
        - and are solid. (*Dynamics.*)
        - and are fluid. (*Hydrodynamics.*)
    - in molecules (MOLECULAR MECHANICS.)
      - when in equilibrium (*Molecular Statics.*)
        - Giving statical properties of matter.
          - general, as impenetrability or space-occupancy.
          - special, as the forms resulting from molecular equilibrium
        - Giving statico-dynamical properties of matter (cohesion, elasticity, etc.)
          - when solid.
          - when liquid.
          - when gaseous.
      - when not in equilibrium (*Molecular Dynamics.*)
        - as resulting in a changed distribution of molecules
          - which alters their relative positions homogeneously
            - causing increase of volume (expansion, liquefaction, evaporation).
            - causing decrease of volume (condensation, solidification, contraction).
          - which alters their relative positions heterogeneously (*Chemistry.*)
            - producing new relations of molecules (new compounds).
            - producing new relations of forces (new affinities).
        - as resulting in a changed distribution of molecular motion
          - which, by integration, generates sensible motion.
          - which, by disintegration, generates insensible motion, under the forms of
            - *Heat.*
            - *Light.*
            - *Electricity.*
            - *Magnetism.*

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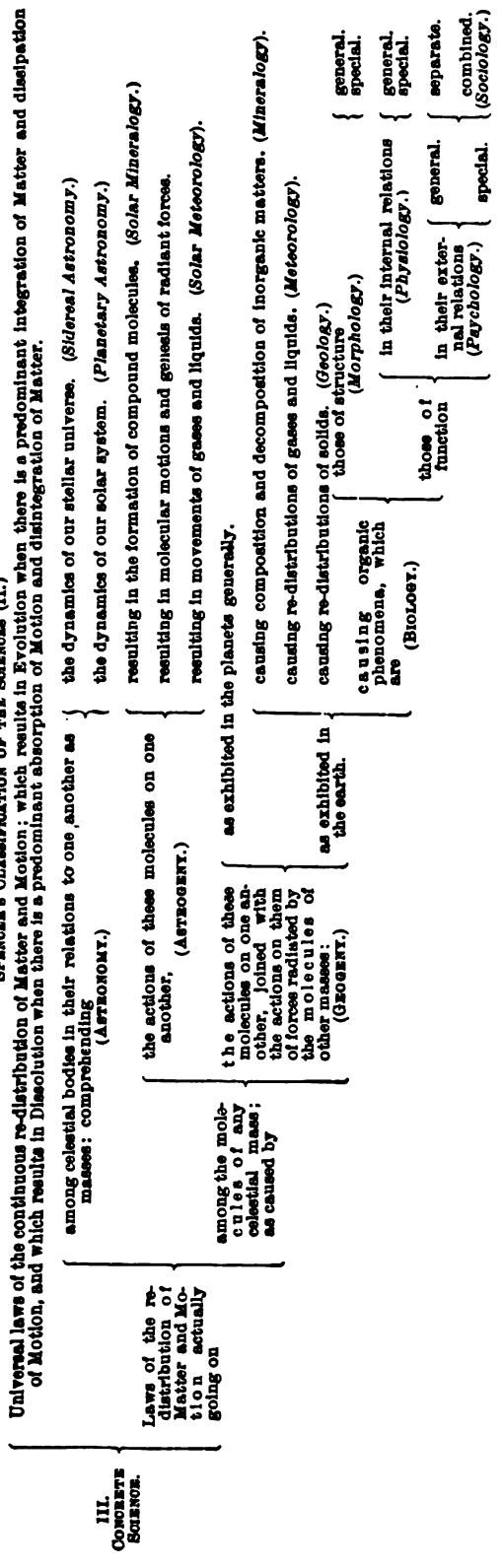

several inquiries, there do arise several knowledges, divine philosophy, natural philosophy, and human philosophy or humanity." "Natural science or theory is divided into physic and metaphysic." Physic should contemplate that which is inherent in matter, and therefore transitory, and metaphysic that which is abstracted and fixed. "Metaphysic includes the inquiry into formal and final causes and mathematics. Mathematics is divided into pure and mixed, the former including geometry and arithmetic, the latter including perspective, music, astronomy, cosmography, architecture, enginery, and divers others." "Physics hath three parts. The first doctrine is touching the contexture or configuration of things. . . . The second is the doctrine concerning the principles or originals of things. The third is the doctrine concerning all variety and particularity of things, whether it be of the differing substances, or their differing qualities and natures."

Hobbes gives a most ingenious classification, which, both on account of its curious interest and of the light it throws upon his general conception of science, is given in the accompanying table, transcribed from his *Leviathan* (1651).

Early in the nineteenth century three ambitious classifications were proposed, one by Bentham (1816), one by Comte (1830), and one by A. M. Ampère (1834). Bentham's and Ampère's agree in being dichotomous and characterized by highly artificial terminologies, which form one of the curiosities in the history of science. Both also agree in dividing the sciences into those dealing with body and those dealing with mind. The former Bentham calls somatology, and the latter pneumatology. Somatology is divided into posology (mathematics) or the science of pure quantity, and poiology or the science which deals with qualities. Posology is divided into morphoscopic (geometrical) and alegomorphic (arithmetrical) posology. The latter is further subdivided into gnosto-symbolic and agnosto-symbolic. The former term is his designation for common arithmetic, and the latter for algebraical arithmetic. Poiology is divided into physiurgy (natural history) and anthropourgy (natural philosophy). Physiurgy is divided into uranoscopy (astronomy) and epigeoscopy (terrestrial natural history). Epigeoscopy is divided into abioscopy (mineralogy) and embioscopy (physiology). All these are again subdivided and sub-subdivided till one has a fairly complete Greek dictionary at last. The divisions of anthropourgy the inquisitive will find given in infinite detail in the *Chrestomathia*.

Perhaps the best known and the most thoroughly discussed classification ever made is Comte's. The division is not by genus and species, but by hierarchical order. "The classification," he says, "must proceed from the study of the things to be classified, and must by no means be determined by *a priori* considerations. The real affinities and natural connections presented by objects being allowed to determine their order, the classification itself becomes the expression of the most general fact. . . . It follows that the mutual dependence of the sciences—a dependence resulting from that of the corresponding phenomena—must determine the arrangement of the system of human knowledge." Applying this method, Comte concludes that there are six sciences. "We cannot make them less;

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Wundt's Classification of the Sciences (I.)

- **I. The System of the Special Sciences.**
  - **Formal or Mathematical Sciences.**
    - **General Formal Sciences.**
      - **Quantitative Science of Forms.** (Doctrine of Magnitudes.)
        - Doctrines of Operations on Magnitudes: ***Algebra.***
        - Theory of the Relations of Magnitudes: ***Theory of Functions.***
      - **Qualitative Science of Forms.** (Theory of Manifoldnesses.)
    - **Special Formal Sciences.**
      - **Doctrine of Number.**
        - *Arithmetic:* Doctrine of operations on number.
        - *Number-theory:* Doctrine of numbers and their relations.
      - **Doctrine of Space.**
        - *Synthetic Geometry:* Doctrine of the Origin of Space-forms **from their Element.**
        - *Analytic Geometry:* Theory of the Application of Magnitude-concepts to Space-forms.
      - **Doctrine of Motion.**
        - *Synthetic Kinematics:* Doctrine of the Composition of Motions.
        - *Analytic Kinematics:* Doctrine of the Application of general **Magnitude-concepts** to Problems of Motion.
  - **Real or experimental Sciences.**
    - **Natural Sciences.**
      - **Sciences of Natural Processes.**
        - **General Doctrine of Natural Processes.** (*Dynamics.*)
          - Dynamics of Masses.
            - *Dynamics of Bodies,* treating the **Masses as Wholes.**
            - *Dynamics of Molecules:* Doctrine **of the Movement of minute** Parts of Masses.
          - Dynamics of Ether.
            - *Ether-dynamics:* General Theory **of Motions of Ether.**
            - *Theory of Compound Media:* Ether in connection **with** Ponderable Matter.
        - **Special Doctrine of Natural Processes.**
          - **The Natural Processes without reference to the Qualitative Distinctions of minute Parts of Masses: Physics.**
            - **The Natural Processes in their reciprocal Relations:** ***General Physics.***
            - **The particular Natural Processes (gravity, sound, heat, light, electricity):** *Special Physics.*
          - **The Natural Processes with reference to the Qualitative Distinctions of minute Parts of Masses: Chemistry.**
            - The reciprocal Relations of physical and chemical forces: ***General Chemistry.***
            - **The Chemical Combinations in their Forms of manifestation:** ***Special Chemistry.***
      - **Sciences of Natural Objects.**
        - **Doctrine of World-bodies:** ***Astronomy.***
        - Doctrine of the Earth: *Geography.*
        - Doctrine of Individual Terrestrial Objects.
          - **Natural Objects in their inner Relations:** ***Systematic Natural History,*** **including** ***Mineralogy, Botany,*** **and** *Zoölogy.*
          - Natural Objects in their Relation **to the Earth:** ***Special Geography,*** including *Orography, Hydrography, Geognesy, Geography of Flora and Fauna, Anthropo-geography.*
      - **Sciences of the Natural Processes in Natural Objects.**
        - Physics and Chemistry of Concrete Natural Objects. *Astrophysics, Geophysics* (including *Climatology* and *Meteorology*); *Physics and Chemistry of Minerals; Physics and Chemistry of Organisms; Physiology,* which is divided into General Physiology and the Physiology of Plants and Animals.
        - History of the Evolution of Natural Objects: *Cosmology, Geology,* ***Evolution of Organisms.***
    - **Mental Sciences.**
      - **Sciences of Mental Processes.**
        - The Doctrine of Mental Processes in Human Consciousness: ***Psychology*** **in the narrower sense** (Individual Psychology).
        - Doctrine of Mental Processes under particular conditions.
          - Mental Processes of Individual Beings **and Communities:** ***Animal Psychology; Social Psychology.***
          - Mental Processes in their Relation to Bodily Processes.
            - Doctrines of the Reciprocal **Relations between** Bodily and Mental Processes: ***Psycho-physics.***
            - Doctrine of the Psycho-physical **organization** of Individual Beings and their **Combinations:** ***Psycho-physical Natural History of Animals; Anthropology; Ethnology.***
      - **Sciences of Mental Products.**
        - **Science of Mental Products in general:** *Philology.*
        - **Sciences of the Individual Classes of Mental Products:** *Economics; Politics;* ***Systematic Jurisprudence; Systematic Theology; Theory of the Individual Arts; Special Methodology of the Sciences.***
      - **Sciences of the Evolution of Mental Products.**
        - General History: ***Individual History*** **(Biography);** ***History of Peoples; Universal or World History.***
        - History of the **Individual Classes of Mental Products:** ***Economic History; History of the State and of Law, of Religion, of Art, of the Special Sciences.***

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WUNDT'S CLASSIFICATION OF THE SCIENCES (II.)

- II. THE PHILOSOPHICAL SCIENCES.
  - Theory of Knowledge.
    - Formal Theory of Knowledge or Formal Logic.
    - Real Theory of Knowledge.
      - Historical Development of Knowledge: *General History of the Sciences.*
      - Logical Development of Knowledge.
        - Pure Epistemology or *Epistemology* in the Narrow Sense.
        - Applied Epistemology or *Methodology.*
  - Theory of Principles.
    - General Theory of Principles or *Metaphysics.*
    - Special Theory of Principles.
      - Philosophy of Nature.
        - General.
        - Special
          - *General Cosmology.*
          - *General Biology.*
      - Philosophy of Mind.
        - General. (*Philosophical Psychology.*)
        - Philosophy of the Individual Mental Creations
          - *Ethics* and *Philosophy of Law.*
          - *Æsthetics.*
          - *Philosophy of Religion.*
        - Theory of the Mental Development of Humanity: *Philosophy of History.*

and most scientific men would reckon them as more. Six objects admit of 720 different dispositions. . . . Our problem is, then, to find the rational order, among a host of possible systems." "The true order is determined by the degree of simplicity, or, what comes to the same thing, of generality," of the phenomena which are the objects of scientific investigation. This order turns out to be mathematics, astronomy, physics, chemistry, physiology, and social physics, for the last of which Comte invented the now current name, 'sociology.' The correctness of this order, he argues, is confirmed in various ways. For instance, in education, this is the order in which the sciences must be studied. An astronomer must have learned his mathematics. "Physical philosophers cannot understand physics without at least a general knowledge of astronomy; nor chemists without physics and astronomy; nor physiologists without chemistry, physics, and astronomy; nor, above all, the students of social philosophy, without a general knowledge of all the anterior sciences. As such conditions are, as yet, rarely fulfilled, and as no organizations exist for their fulfillment, there is among us, in fact, no rational scientific education."

Herbert Spencer in 1854 suggested a classification of the sciences which he worked out in detail ten years later, and which has become famous. He begins by criticising Comte's scheme on account of the identification the latter made of the abstract and the general. "Abstractness," he insists, "means detachment from the incidents of particular cases. Generality means manifestation in numerous cases." Not degree of generality—as by Comte—but of abstractness is by Spencer regarded as the proper basis for division of the sciences. Applying this principle of division, he obtains three classes of sciences, the abstract, the abstract-concrete, and the concrete sciences. The various subdivisions of these classes are shown in the accompanying table.

One of the most carefully worked out classifications ever published is Wundt's (1889).† He objects to most previous classifications because they attempt to force some arbitrary schematism upon the facts. One must find the scheme in the facts themselves, he argues, and these facts are not the object-matter of the sciences, but the points of view which the various sciences take of their object-matter. The point of view of a science is a conceptional point of view. It is taken in order that from this vantage ground we may survey the facts and bring them into intelligible relations. This point of view determines the method pursued by any science. As sciences are distinguished by their conceptional points of view, Wundt classifies them according to these points of view. The first division, according to this principle, is into the special sciences and philosophy. The special sciences deal with facts from some single point of view; philosophy takes a more comprehensive survey of our knowledge of these same facts. "While the special sciences divide knowledge into a great number of objects of knowledge, the eye of philosophy is from the start directed toward the organic unity (*Zusammenhang*) of all these objects of knowledge." The various subdivisions of the special sciences and of philosophy, as worked out by Wundt, are to be found in the accompanying table.

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In surveying all these classifications, the question arises whether any one classification is possible which can claim validity to the exclusion of the others. As was observed at the outset, a classification depends, among other things, upon the principle employed. Is only one principle applicable in the classification of the sciences? To answer this question affirmatively seems to be dogmatic. The various sciences are related in *various* ways, and why any single one of these ways should be chosen as the sole possible basis of valid classification, it is difficult to see. The dogmatism of such an assumption can be illustrated by referring to the classification of books in a library. A library may be arranged alphabetically, or chronologically, or topically, etc. No one of these arrangements is the only proper one. Which shall be chosen depends upon the *use* to which the classification is to be put.

Consult Ueberweg-Heinze, *Grundriss der Geschichte der Philosophie*, for ancient classifications; for several modern classifications, consult: Bacon, *Advancement of Learning* (1605); Hobbes, *Leviathan* (1651); Locke, *Essay Concerning Human Understanding* (1690); d'Alembert, *Mélanges* (1767); Bentham, *Chrestomathia* (1816); Comte, *Cours de philosophie positive* (1830); Ampère, *Essai sur la philosophie des sciences* (1834); Spencer, *The Genesis of Science* (1854) and *The Classification of the Sciences* (1864), both republished in vol. ii. of his *Essays* (American ed. 1891); Erdmann, "Die Gliederung der Wissenschaften," in *Vierteljahrschrift für wissenschaftliche Philosophie*, vol. ii.; Wundt, "Ueber die Eintheilung der Wissenschaften," in *Philosophische Studien*, vol. v.; also his *Logik* (2d ed., Leipzig, 1893-95); La Grasserie, *De la classification* (Paris, 1893); Goblot, *Essai sur la classification des sciences* (ib., 1898); Naville, *Nouvelle classification des sciences* (ib., 1901).

SCIENTIFIC ALLIANCE OF NEW YORK, THE. An association of scientific bodies with headquarters at the New York Botanical Gardens and including the resident active members of the New York Academy of Sciences, the Torrey Botanical Club, the New York Microscopical Society, the Linnean Society of New York, the New York Mineralogical Club, and the New York Entomological Society. The Council of the Scientific Alliance is composed of the president and two members from each of the allied societies. In 1902 the Alliance had a total membership of 691. See ENTOMOLOGICAL SOCIETY, AMERICAN; MICROSCOPICAL SOCIETY, THE AMERICAN; NEW YORK ACADEMY OF SCIENCE; TORREY BOTANICAL CLUB.

SCILLA. See SQUILL.

SCILLY (sĭl'lĭ) **ISLANDS.** A group of islands forming the southwesternmost part of Great Britain, 27 miles west-southwest of Land's End, Cornwall (Map: France, A 2). The group consists of about 140 islands and rocks, comprising a circuit of 30 miles, and the islands are the high points of the submerged and traditional land of Lyonesse which extended to the mainland. Navigation around the islands is dangerous. Only five of them are inhabited. Saint Mary's, the largest, has 1528 acres; Tresco, 697; Saint Martin's, 515; Saint Agnes, 313; Sampson and Bryher, 269. The climate is mild. The soil is in general sandy, but in Tresco and Saint Agnes it is remarkably fertile. The cliffs abound with sea-fowl, and are covered with samphire. The inhabitants are chiefly engaged in agriculture, floriculture, and fishing. Large quantities of potatoes are produced; narcissi and other flowers are sent to London and Bristol.

Hugh Town is the capital, and contains an odd mixture of old-fashioned and neat modern houses.

By the ancients, these islands were named Cassiterides, Hesperides, and Siluræ Insulæ. The term Cassiterides, or 'Tin Islands,' by which they were known to the Greeks and Romans, was once applied to the peninsula of Cornwall.

There are numerous remains of prehistoric monoliths, stone circles, kistvaens, rock-basins, and cromlechs. The Scilly Islands were in 936 granted by Athelstane to some monks who settled at Tresco. They were afterwards granted to the Abbey of Tavistock by Henry I., and were conferred by Queen Elizabeth on the Godolphin family. They are now Crown property. Population, in 1901, 2100.

SCINDE, sĭnd. A region of British India. See SINDH.

SCINDIA, or **SIDHIA,** sĭn'dĭ-ȧ. The name of a Mahratta dynasty, rulers of Gwalior, in Central India. See SINDIA.

SCINTILLATION (Lat. *scintillatio*, from *scintillare*, to sparkle, from *scintilla*, spark). The apparent twinkling or flickering of a star, including the changes of color that are seen when the stars are near the horizon. A perfectly satisfactory explanation of this phenomenon has been given by Exner of Vienna, who shows that it is due entirely to the irregular refraction of rays of light passing through the heterogeneous mixture of warm and cold air that ordinarily exists in the atmosphere. The minute streams of warm and cold air, oftentimes of a smaller diameter than that of the pupil of the eye, cause points on a large object to dance about while the object as a whole remains stationary. Therefore the edges of the sun or moon or planets appear to scintillate, while these objects as a whole are quite steady owing to their large apparent angular diameter. The frequency and extent of the oscillations and changes of color may be observed by means of the scintillometer, by which the image of a star is drawn out into a circle, and the rapid changes of the light are seen distributed along the circumference. Regular observations have shown that scintillation is more decided before the approach of a storm, and in various ways this phenomenon is so connected with atmospheric changes as to form a regular subject of observation by some meteorologists.

SCIO. An island of the Ægean Sea. See CHIOS.

SCIOP'PIUS (Latinized form of *Schoppe*), KASPAR (1576-1649). A classical scholar and controversialist, born at Neumarkt, in the Palatinate. He studied at Heidelberg, Altdorf, and Ingolstadt. In 1598 he became a Roman Catholic. Henceforth his career is a series of attacks both on Protestantism and on his personal enemies. He assailed first Joseph Justus Scaliger (q.v.), against whom, in 1607, he wrote his *Scaliger Hypobolimæus*. In 1611 he attacked King James of England in libelous pamphlets. Some three years after, when staying at Madrid, he was in retaliation beaten by the servants of Lord Digby, the

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English Ambassador. Scioppius fled from Spain to Ingolstadt, where he issued his *Legatus Latro* against the Ambassador. Among his numerous works the most important are: *Poemata Varia* (1593); *De Arte Critica* (1597); *Smybola Critica in Apuleii Opera* (1605); *De Rhetoricarum Exercitationum Generibus* (1628); *Grammatica Philosophica, sive Institutiones Grammaticæ Latinæ* (1628); *Rudimenta Grammaticæ Philosophicæ* (1629); *De Studiorum Ratione* (1636); and editions of Varro's *De Lingua Latina* (1605) and the *Epistles* of Symmachus (1608).

SCIOTO, sī-ōt'ō. A river of Ohio. It rises in Auglaize County, flows south through a fertile and populous valley in the centre of the State past the city of Columbus, and joins the Ohio River at Portsmouth after a course of 200 miles (Map: Ohio, E 7). It is navigable 130 miles at high water, and its course is followed for 90 miles by the Ohio and Erie Canal.

SCIPIO, sĭp'ē-ō. The name of a distinguished Roman patrician family of the Cornelia gens. PUBLIUS CORNELIUS SCIPIO, surnamed AFRICANUS MAJOR, one of the most accomplished warriors of ancient Rome, was born B.C. 237, not in 234, as Livy says. He is first mentioned as taking part in the battle of the Ticinus (B.C. 218), where he saved his father's life. Two years later he fought at Cannæ as a military tribune, but was one of the few Roman officers who escaped from that disastrous field. In B.C. 212 he was elected ædile, though not legally qualified by age, and in the following year proconsul, with command of the Roman forces in Spain. His appearance there restored fortune to the Roman arms. By a bold and sudden march he captured Nova Carthago, the stronghold of the Carthaginians, and obtained an immense booty. At Bæcula, in the valley of the Guadalquivir, he defeated Hasdrubal with heavy loss, but could not prevent him from crossing the Pyrenees and marching to the assistance of Hannibal. In B.C. 207 he won a more decisive victory over the other Hasdrubal, son of Gisco, and Mago, at an unknown place called Silpa, or Elinga, in Andalusia—the effect of which was to place the whole of Spain in the hands of the Romans. Soon after he returned to Rome, where he was elected consul (B.C. 205), though he had not yet filled the office of prætor; and in the following year he sailed from Lilybæum, in Sicily, at the head of a large army, for the invasion of Africa. His successes compelled the Carthaginian Senate to recall Hannibal from Italy. This was the very thing that Scipio desired and had labored to achieve. The great struggle between Rome and Carthage was terminated by the battle fought at Naragra, on the Bagradas, near Zama, October 19, B.C. 202, in which the Carthaginian troops were routed with immense slaughter. Hannibal advised his countrymen to abandon what had now become a hopeless and ruinous contest, and peace was concluded in the following year, when Scipio returned to Rome and enjoyed a triumph. The surname of Africanus was conferred on him, and so extravagant was the popular gratitude that it was proposed to make him consul and dictator for life, honors which Scipio was either wise enough or magnanimous enough to refuse. When his brother Lucius, in 190, obtained command of the army destined to invade the territories of Antiochus, King of Syria, Scipio served under him as legate. Lucius was victorious in the war, and on his return to Rome (B.C. 189) assumed (in imitation of his brother) the surname of Asiaticus. But the clouds were now gathering heavily round the Scipios. In B.C. 187 Cato Major and others induced two tribunes to prosecute Lucius for allowing himself to be bribed by Antiochus in the late war. He was declared guilty by the Senate, his property was confiscated, and he himself would have been thrown into prison had not his brother forcibly rescued him from the hands of the officers of justice. In B.C. 185 Scipio himself was accused by the tribune, M. Nævius; but instead of refuting the charges brought against him (which were probably groundless), he delivered, on the first day of his trial, a eulogy on his own achievements, and opened the second day by reminding the citizens that it was the anniversary of the battle of Zama, and therefore not a time for angry squabbling, but for religious services. He then summoned the people to follow him to the Capitol to give thanks to the immortal gods and to pray that Rome might never want citizens like himself. His audience were electrified, and the thing was done before opposition became possible. To resume the trial was out of the question; but Scipio felt that popular enthusiasm was not to be depended on and that his day was over. He retired to his country-seat at Liternum, in Campania, where he died, B.C. 183 or 185. Scipio is commonly regarded as the greatest Roman general before Julius Cæsar.

PUBLIUS CORNELIUS SCIPIO ÆMILIANUS, surnamed AFRICANUS MINOR, born about B.C. 185, was a younger son of Lucius Æmilius Paulus, who conquered Macedon, but was adopted by his kinsman, Publius Scipio, son of Scipio Africanus Major, who had married the daughter of that Lucius Æmilius Paulus who fell at Cannæ. Scipio accompanied his father on his expedition against Macedon, and fought at the decisive battle of Pydna, B.C. 168. In B.C. 151 he went to Spain as military tribune, in the train of the Consul Lucius Lucullus, and distinguished himself alike by his valor and his virtue. Two years later began the Third Punic War, which mainly consisted in the siege of Carthage. Scipio still held the subordinate position of military tribune; but the incapacity of the consuls, Manius Manilius and Lucius Calpurnius Piso, and the brilliant manner in which he rectified their blunders, fixed all eyes upon him. The favorite both of the Roman army and the Roman people, Scipio was at length, in B.C. 147, when only a candidate for the ædileship, elected consul by an extraordinary decree of the Comitia, and invested with supreme command. After a protracted defense Carthage was finally taken by storm in the spring of B.C. 146; and by the orders of the Senate it was leveled to the ground. Scipio, though probably the most accomplished Roman gentleman of his age, was rigorous in his observance of the antique Roman virtues; and when holding the office of censor in B.C. 142 he strove to follow in the footsteps of Cato. But his efforts to repress the increasing luxury and immorality of the capital were frustrated by the opposition of his colleague, Lucius Mummius, the rough conqueror of Corinth. In B.C. 139 Scipio was accused of the *crimen majestatis* by the tribune Tiberius Claudius Asellus, but was acquitted, and soon after was

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defeats on the Roman armies, and his example had roused the hopes of the Celtiberian tribes, who also rushed to war against the common foe. The contest continued with varying success; but the interest centred in the city of Numantia, whose inhabitants displayed amazing courage in the struggle with Rome. For long it seemed as if the Numantines were invincible, one consul after another finding their subjugation too hard a task; but at length, in B.C. 134, Scipio, reëlected consul, was sent over to Spain, and after a siege of eight months forced the citizens, who were dying of hunger, to surrender, and utterly destroyed their homes. He then returned to Rome, where he took a prominent part in political affairs, appearing as the leader of the aristocratic party, in consequence of which his popularity with the democratic party greatly declined. Although a brother-in-law of Tiberius Gracchus, whose sister, Sempronia, he had married, he disclaimed any sympathy with his political aims, and when he heard of the murder of his kinsman, quoted his favorite Homer: "So perish all who do the like again." His attempts (B.C. 129) to rescind that portion of the agrarian law of Tiberius Gracchus relating to the lands of the allies excited furious indignation. When he went home from the Senate he had to be accompanied by a guard. Next morning he was found dead in his bed, the prevailing suspicion being that he was murdered either by or at the instigation of Papirius Carbo, his most rancorous political enemy. Scipio was neither a rigid aristocrat nor a flatterer of the people. Inferior in splendor of genius to his adoptive grandfather, he surpassed him in purity of character, in simplicity of patriotism, and in liberality of culture.

QUINTUS CÆCILIUS METELLUS PIUS, a son of P. Cornelius Scipio Nasica, but adopted by Quintus Cæcilius Metellus Pius; sometimes called Publius Scipio Nasica and sometimes Quintus Metellus Scipio. He is first mentioned in history in B.C. 63, when he divulged to Cicero the conspiracy of Catiline. He was elected tribune in 60, when he was accused of bribery by the disappointed candidate, and defended by Cicero. In 53 he offered himself for the consulship, but the rivalry between the candidates and their factions led to such violence and bloodshed that no election was held. Then followed the murder of Clodius (q.v.), and during the ensuing anarchy Pompeius was made consul without a colleague. Soon after he married Scipio's daughter, Cornelia, and made Scipio his fellow-consul. Thenceforth all of Scipio's efforts were directed toward the aggrandizement of Pompeius and the overthrow of Cæsar's power. At the expiration of his term of office he went as proconsul to Syria, where his rule was complained of as oppressive. He served with Pompeius in Greece, and after the battle of Pharsalia fled to Africa, where the remnants of the Pompeian forces had the support of King Juba (q.v.). Scipio held the chief command, but was defeated by Cæsar in the battle of Thapsus (B.C. 46) and committed suicide.

SCIPIOS, TOMB OF THE. The famous tomb on the Appian Way in Rome, which once contained the sarcophagus of Scipio Barbatus (con-

SCIRE FACIAS, sī'rē fā'shi-ăs (Lat., that you make known). A writ commanding the defendant to appear in court and show cause, if possible why some matter of record should not be enforced, vacated, or modified. The hearing or trial under this writ is usually called a *scire facias* proceeding. *Scire facias* is employed for many purposes, and in general is merely supplemental to or a continuation of former proceedings, as to revive or continue the lien of a judgment; but in some cases it is practically an original action. A writ of *scire facias* must be founded upon some public record, either judicial or otherwise. The defendant may demur, plead, or answer, or make a motion to quash the writ. Substantially the same defenses are allowed as in an ordinary action (q.v.), except that where the *scire facias* proceedings are merely a continuation of a former action the defendant cannot introduce any defense which would have been available in the latter. A judgment may be entered upon the determination of the proceeding, and from this an appeal will lie. *Scire facias* proceedings were practically rendered unnecessary and obsolete in England by the Judicature Acts (q.v.), although not expressly abolished. In many of the United States other actions or proceedings have been substituted by practice acts and codes, and proceedings by the writ of *scire facias* abolished. Consult Foster's *Scire Facias* (Philadelphia, 1851) and the authorities referred to under WRIT.

SCIRPUS (Lat., rush, bulrush). A genus of about 200 species of plants of the natural order Cyperaceæ, sometimes called club-rush, some of them very small in comparison with the bulrush (*Scirpus lacustris*). Deer's hair (*Scirpus cæspitosus*) is only 2 or 3 inches high. The rootstocks or tubers of certain species are eaten by the natives of Southern India. Several of the larger growing species are used for making mats, others check the drifting of sand upon beaches. See BULRUSH.

SCIRRHUS. See TUMOR.

SCISSORBILL. A bird, the skimmer (q.v.).

SCISSORS and **SHEARS.** See CUTLERY.

SCISSOR-TAILED FLYCATCHER. A beautiful flycatcher (*Milvulus forficatus*) of the Southwestern United States, remarkable for its long outer dark-tipped tail feathers, which in flight open and shut like a pair of scissors. The body is about 3½ inches long; the tail about 9½ inches. The general color is light bluish gray, the back and wing-linings reddish, the lower parts white, washed along the flanks with salmon-pink. Females are paler than males. The nest is composed of sticks, lined with feathers and soft materials; and the eggs are salmon-brown with darker, curiously scratched markings. A tropical relative of this exquisite and active bird is the fork-tailed flycatcher (*Milvulus tyrannus*), whose tail-feathers are black. See Plates of FLYCATCHERS and EGGS OF SONG BIRDS.

SCLA'TER, PHILIP LUTLEY (1829—). An English zoölogist. He studied at Corpus Christi College, Oxford, was admitted a barrister of Lincoln's Inn, and in 1859 became secretary of the Zoölogical Society of London, and in 1860 editor

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of *The Ibis*, a quarterly journal of ornithology. His writings include about twelve hundred memoirs on zoölogical topics, and several extended works, such as the *Monograph of the Jacmars and Puff-Birds* (1882).

SCLERO'SIS (Neo-Lat., from Gk. σκλήρωσις, *sklērōsis*, induration, from σκληρός, *sklēros*, hard). A hardening, resulting from degenerative changes in which normal tissues are replaced by connective tissue, as in a scar; an induration. The hardening of the middle coat of an artery is termed arterio-sclerosis (q.v.). Replacing of the normal tissue of the liver by contractile connective tissue is termed cirrhosis of the liver (q.v.). Degeneration and destruction of the tissue of the spinal cord, or of the brain, is termed sclerosis, which in these cases is a fibroid and neuroglia induration.

SCLEROS'TOMA (Neo-Lat., from Gk. σκληρός, *sklēros*, hard + στόμα, *stoma*, mouth). A well-known genus of roundworms. One species (*Sclerostoma syngamus*) is of special interest, as being the cause of the disease in poultry known as the gapes (q.v.). Another important species is *Sclerostoma duodenale*. This worm, which usually measures about one-third of an inch in length, is especially characterized by an asymmetrical disposition of four horny, conical, oval papillæ, of unequal size, forming the so-called teeth. This worm is tolerably common throughout Northern Italy. It also occurs in India, Brazil, the Antilles, Switzerland, and Belgium, and is the cause of the disease called miner's anæmia. It is remarkably abundant in Egypt, where, it is said, about one-fourth of the population are constantly suffering from a severe anæmic chlorosis, occasioned solely by the presence of this parasite.

SCLEROTICA. See EYE.

SCLOPIS DI SALERANO, sklō'pĭs dē sä'lärä'nō, FEDERIGO, Count (1798-1878). An Italian jurist and statesman. He was born in Turin and was educated at the University of Turin. He entered the service of the Sardinian Government in the Department of the Interior, rose to be a member of the Supreme Court, and in March, 1848, became Minister of Justice in the Balbo Cabinet, going out of office, however, in July. In 1849 he became a member of the Senate, over which he presided from 1861 to 1864. In the latter year he was admitted to the Academy of Turin. He was nominated by the King of Italy to the Geneva tribunal for the arbitration of the Alabama Claims (q.v.) and was president of the court. He was the author of *Storia dell' antica legislazione del Piemonte* (1833); *Storia della legislazione italiana* (1840-57); *Sull' autorità giudiziaria* (1842); *Le relazioni politiche tra la dinastia di Savoia ed il governo britannico dal 1240 al 1815* (1853).

SCO'GAN, HENRY (c.1361-1407). The reputed author of a collection of jests compiled in the sixteenth century. He is said to have been a fool at the Court of Henry IV. Though the collection was made as early as 1565, the earliest extant edition bears the date 1626. The title runs *The First and Best Parts of Scoggins Jests. Full of Witty Mirth and Pleasant Shifts, done by him in France and other places: being a Preservative against Melancholy. Gathered by Andrew Boord, Doctor of Physicke.* Andrew Boorde (q.v.), the reputed collector, was a famous sixteenth-century wit, who satirized the fantastic dress of the time by a woodcut of a naked Englishman standing with a pair of shears in one hand and a piece of cloth over the other arm, uncertain what style to wear. He probably had nothing to do with the compilation of the so-called Scogan jests, which was made by some unknown hand from various sources for the bookseller. Similar collections bear the name of John Skelton (q.v.) and of Joseph Miller (q.v.). Consult *Old English Jest Books*, ed. by Hazlitt (vol. ii., London, 1864); and see JEST.

SCOLECIDA (Neo-Lat. nom. pl., from Gk. σκώληξ, *skōlēx*, worm). A name, now obsolete, of a group of Annuloida or Vermes, comprising the Entozoa of Cuvier and also the free Turbellaria.

SCOL'LARD, CLINTON (1860—). An American poet and educator. He was born at Clinton, Oneida County, New York. He graduated from Hamilton College in 1881, and pursued graduate study at Harvard University and in Cambridge, England. He was assistant professor of rhetoric at Hamilton College from 1888 to 1893, and from then till 1896 of English literature. He published several volumes of poems, both light and serious. They are: *Pictures in Song* (1884); *With Reed and Lyre* (1886); *Old and New World Lyrics* (1888); *Giovio and Giulia, a Metrical Romance* (1892); *Songs of Sunrise Lands* (1892); *The Hills of Song* (1895); *Skenandoa* (1896); *A Boy's Book of Rhyme* (1896). He has also produced two volumes of prose: *Under Summer Skies* (1892) and *On Sunny Shores* (1893).

SCOMBRIDÆ (Neo-Lat. nom. pl., from Lat. *scomber*, from Gk. σκόμβρος, *skombros*, mackerel). A large and important family of spiny-rayed fishes, including mackerels, tunnies, and bonitoes. Some species grow to a very large size—1,500 pounds. They are migratory, traveling in schools, often in great numbers. The family contains about 60 species, most of which are excellent food-fishes, and some have a great economic value. See MACKEREL; FISHERIES.

SCONE, skōōn. A parish in Perthshire, Scotland, on the Tay, 2 miles from Perth (Map: Scotland, E 3). Population, in 1901, 2,362. It is first mentioned in the beginning of the tenth century as the royal city, when a council was held there in the reign of King Constantine II. A monastery was built at Scone about the same period, and there was located the famous stone on which the kings of the Scots were inaugurated, and which was carried by Edward I. of England to Westminster Abbey. An abbey was founded by Alexander I. in 1115, in which the sovereigns continued to be inaugurated and crowned. The last coronation celebrated at Scone was that of Charles II. on January 1, 1651. The viscounts of Stormont had a residence here known as the Palace of Scone. The present palace, belonging to the Earl of Mansfield, was erected on the same site after 1800.

SCO'PAS (Lat., from Gk. Σκόπας, *Skopas*). A famous Greek sculptor, born at Paros and active during the first half of the fourth century B.C. He is called the architect of the new Temple of Athena Alea at Tegea, which replaced a temple burned in B.C. 395-94, and he was one of the sculptors of the Mausoleum (q.v.) completed about B.C. 350. Until recently the works of Scopas were known only through literary ref-

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erences. The discovery in 1879 of the fragments of the pediment sculptures at Tegea has afforded a basis for the analysis of the style of Scopas, and rendered it possible to recognize copies of his work in such figures as the Meleager of the Vatican (much better represented in a statue in the Fogg Art Museum at Harvard University and a head in the Villa Medici), and the seated Mars formerly in the Villa Ludovisi. To him also seems to belong a type of Hercules, of which perhaps the best example is the bust from Genzano in the British Museum. To these may be added a fine female head from the south slope of the Acropolis, and a torso of Æsculapius from the Piræus, both in the National Museum at Athens. All these works are characterized by the broad and rather short face, in marked contrast to the long oval of the Hermes of Praxiteles, the deep-set eye, and especially by the intensity of expression. To produce this effect the work is concentrated on certain features such as eyes and mouth, while in the works of Praxiteles the whole surface is carefully finished. Consult especially Graef in *Römische Mittheilungen*, iv. (Rome, 1889); also Urlichs, *Skopas' Leben und Werke* (Greifswald, 1863); Weil, in Baumeister's *Denkmäler des klassischen Altertums* (Munich, 1889); Treu, *Athenische Mittheilungen*, vi. (Athens, 1881); Furtwängler, *Masterpieces of Greek Sculpture*, trans. by E. Sellers (London, 1895).

SCORE (AS. *scor*, score, twenty, from AS., OHG. *sceran*, Ger. *scheren*, Eng. *shear;* connected with Gk. *κείρειν*, *keirein*, to cut, Lat. *curtus*, short). In music, the arrangement of the various voices or instruments, employed in a composition, in such a manner that all tones which are to be sounded together are written vertically. Before the seventeenth century compositions were not generally printed in scores, but in part-books, each book containing only one part or voice of a composition. (See PART-BOOK.) In the case of organ music, however, an imperative need was felt at an early time to write all those tones which were to be struck together one above the other; hence the organ-tablature. (See TABLATURE.) Hucbald (q.v.), who lived in the tenth century, wrote his works in scores. There seems to be little doubt that from the earliest times composers wrote their works originally in score. There are two noteworthy examples of early scores: one a printed score of madrigals composed by Cipriano de Rore, and printed in 1577 by Gardano in Venice; the other an original manuscript where all four voices are written on one staff, the notes of the different voices being distinguished by different colors and forms.

As to *orchestral* scores, it is probable that all music written for a combination of orchestral instruments was published only in score form. Some of the earliest specimens of such scores are those of de Beaujoyeaulx's *Ballet comique de la Royne* (Paris, 1582), Peri's *Eurydice* (Florence, 1600), Cavaliere's *Anima e corpo* (Rome, 1600), and Monteverde's *Orfeo* (Venice, 1609). (See ORCHESTRA.) The guiding principle at first was to place the highest instruments at the top and the lowest at the bottom of the page. But as the wood and brass instruments were gradually perfected and became parts of the orchestra, this principle could no longer be strictly followed. Hence, a new plan was adopted. Instruments of the same group or family were kept together. If voices were employed with the orchestra, they were kept together, but for some time great confusion prevailed as to their position relative to the instruments. Bach generally wrote the instrumental parts above the voices and the organ parts below the voices. Handel followed the same principle very closely, but placed the 'celli and basses below the voices. Both masters wrote the brass instruments above the wood-wind.

The score-reader must keep in his mind a different grouping of instruments for every score; but even without this, score-reading presents enough difficulties. Beethoven, therefore, established a certain fixed order in which he arranged his scores, so that the same instruments are always written in the same place. He adopted what was then known as the German system, i.e., the wood-wind highest, next the brass, then instruments of percussion, and the strings lowest. The Italian system differed by placing violins and violas highest, then the wood and brass, the 'celli and basses lowest, a system not to be commended, because it separates the strings, which constitute the foundation of the orchestra. Although later masters, especially Berlioz, Liszt, and Wagner, have introduced a great number of new instruments, they adhere in general to Beethoven's grouping.

As the military band has no strings, the scores written for such a combination of instruments naturally differ from full orchestral scores. But the principle of grouping remains the same.

For the convenience of musicians, and also to enable amateurs to study the great orchestral compositions by playing them in a reduced form upon the piano, all the full scores are arranged for this instrument. Such a reduced score of a purely instrumental composition is called *pianoforte score*, of a vocal work with orchestra a *vocal score*. In the latter the voices appear as in the full score, but the orchestra is reduced to the two staves of the piano. Such arrangements require much skill and experience.

There is also the *compressed score*, used for vocal composition, in which the four voices are compressed into two staves (soprano and alto on the treble, tenor and bass on the bass staff). A *supplementary score* is used when the number of voices or instruments is so large that there is not room enough for all staves on one page. Then some group is printed separately and added at the end of the full score.

SCORE-READING AND PLAYING FROM SCORE. One of the principal requirements of a good orchestral conductor is the ability to read an orchestral score and to reproduce it at sight upon the piano. (See CONDUCTOR.) This ability can be obtained only through constant practice. The first requirement toward this result is thorough familiarity with the C clefs. (See CLEF.) The beginning should be made with *a cappella* choruses for four mixed voices, where the tenor part (written in the treble clef) is to be transposed an octave lower. Then easy string quartets should be played (requiring the use of the alto clef in the violas). The next step would be to works of chamber-music written for one transposing instrument, like the clarinet or horn. After a certain degree of skill has been attained in playing such scores the student is ready for works scored for a small orchestra. It is com-

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SCOPAS

1. MARS, VILLA LUDOVISI, ROME

2. HERCULES FROM GENZANO BRITISH MUSEUM

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paratively easy to proceed from this point to the reading of complicated scores. No one should attempt playing from score who has not a thorough knowledge of harmony as well as a fair knowledge of counterpoint. In reading a large score it is impossible to look at every individual note. A glance at the double-basses, violins, and horns, as a rule, will suffice to establish the particular chord. The fundamental bass part and the melodic outline must be strictly preserved, but the intermediate harmonies must be recognized at a glance and distributed on the spur of the moment. On account of the transposing instruments, skill in transposition is essential.

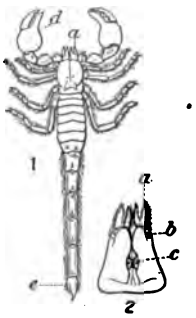
SCOREL, skō′rĕl, JAN VAN (also SCHOREEL and SCHOORLE) (1495-1562). A Dutch landscape, historical, and portrait painter, the first to bring the influence of the Italian Renaissance into Holland. He was born at Schoorl, near Alkmaar, studied under the brothers Jacob and Willem Cornelisz at Haarlem and Amsterdam, and finally became a pupil of Albert Dürer in Nuremberg. Subsequently he went to Rome, where he was made overseer of the Vatican Gallery by his countryman, Pope Adrian VI. His pictures are now rather scarce, as many of them were destroyed by the Dutch iconoclasts. There are a "Magdalen," a "Queen of Sheba," a "Bathsheba," and an "Adonis," in the museum at Amsterdam; a Madonna and portraits of a man and of a boy, in Rotterdam; "The Fall of Man," "The Baptism of Christ," "Saint Cecilia," and a portrait group of Knights Templars at Haarlem.

SCORESBY, skōrz′bĭ, WILLIAM (1789-1857). An English Arctic explorer and physicist. He was born near Whitby, Yorkshire. When only eleven years of age the boy accompanied his father, a whaler, to Greenland and afterwards he was his constant companion on his voyages. During the winter months he studied in Edinburgh University, navigation, mathematics, natural history, chemistry, and some other branches. After 1806 he began the study of the meteorology and natural history of the Arctic regions, and attracted the attention of scientific men by his careful and accurate papers on these topics. In 1806, while chief officer on his father's ship *Resolution*, he reached latitude 81° 30′ N. in longitude 19° E., the most northern point authentically known to have been attained up to that time. His father and he saw the unknown coasts of East Greenland in their voyages of 1817 and 1821. It was in 1822, however, that Scoresby made his most important voyage. Early in June he was near enough to Greenland to chart the coast from Cape Hold with Hope (discovered and named by Hudson in 1607 on the north side of the entrance of Franz Josef Fiord in 73° 30′ N.) to Gale Hamke Bay, 75° N., named after its Dutch discoverer in 1654. During the next three months he surveyed and charted with great care and accuracy 800 miles of winding coasts, completely changing the supposed geographic features of East Greenland.

Scoresby afterwards entered the Church and was appointed curate of Bassingby in 1825. His scientific labors, however, ended only with his life. He contributed largely to the knowledge of terrestrial magnetism, made a voyage to Australia in 1856 to obtain new data on this subject, wrote many papers for the Royal and other societies on this and other branches of science, and made valuable observations on the height of Atlantic waves during two visits to America. He was also much interested in social problems and especially in improving the condition of factory operatives. His Arctic books are *History and Description of the Arctic Regions* (1820), and *Journal of a Voyage to the Northern Whale Fishery, Including Researches and Discoveries on the Eastern Coast of Greenland* (1823). His *Journal of a Voyage to Australia for Magnetical Research* was published in 1859, after his death. His nephew, Dr. R. E. Scoresby-Jackson, published *Life of William Scoresby* (London, 1861).

SCORPÆNIDÆ, skôr-pē′nĭ-dê (Neo-Lat. nom. pl., from Lat. *scorpæna*, from Gk. σκόρπαινα, *skorpaina*, sort of fish, from σκορπιός, *skorpios*, scorpion). A very large and important family of spiny-rayed fishes, the rockfishes (q.v.). The body is elongate, compressed, and bears ctenoid scales. The head is large and armed to a greater or less extent with ridges or spines. The mouth is usually large, the teeth villiform. The dorsal fin is long, the anterior portion spinous; the anal short, with three spines, and 5 to 10 soft rays. Many of the species are viviparous, the young being when born about one-fourth inch long. They are non-migratory fishes, inhabiting the rocky margins of all seas, especially the temperate Pacific. The family includes about 30 genera and 250 species, many of them of large size and all good as food-fishes. Many of the species are reddish and are hence called 'rose-fishes' (q.v.).

SCORPION (Lat. *scorpio*, from Gk. σκορπίος, *skorpios*, scorpion). One of the tailed arachnids of the order Scorpionida, natives of warm countries in both the Eastern and Western Hemispheres. The body is divided into a short, compact, leg-bearing cephalothorax and a long segmented abdomen. The last five segments of the abdomen form a slender, tail-like portion. The terminal segment is modified into a curved sharp sting provided with two pores from which the poison flows. The poison is supplied by two poison glands at the base of the segment. To the cephalothorax are attached six pairs of appendages. The first pair (mandibles) is short, the second pair (palpi) long, and both pairs bear pincers. Those of the palpi are very large and resemble lobster claws. The four succeeding pairs of appendages are true legs. The abdomen is without appendages save the second segment, which bears two comb-like organs, the pectines, the function of which is not known. There are four spiracles or breathing pores on each side of the abdomen. There are from three to six pairs of eyes. The sexes differ in the broader pincers and longer abdomen of the male. They are viviparous and the mother carries her young about with her for some time after they are born. They cling to all parts of her body by means of their pincers. Scorpions feed on spiders and



SCORPION.

1, Full figure of *Scorpio afer*; 2, mouth-parts enlarged; *a*, cheliceræ; *b*, lateral ocelli; *c*, central large ocelli; *d*, maxillary palpi; *e*, telson (the sting).

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large insects, which they seize with their claws and kill by their poisonous sting. They hide by day in crevices, under stones or in dark holes, and are largely nocturnal in their habits. They run with great swiftness and with the tail curved over the back. Some species may enter houses and hide in boots, shoes, or garments, and, when disturbed, sting human beings. The sting is very painful, but rarely, if ever, fatal. The poison should be pressed or sucked out of the wound and ammonia should be applied externally and taken internally. No scorpions occur in the United States north of Nebraska, but in the South about 20 species are known.

Scorpions are the most primitive of living arachnids, show very close resemblance to the king crab (q.v.), and occur as fossils in the Silurian rocks, but the early forms differ little from modern types. The word 'scorpion' is used in combination in the common names of other closely related orders such as the false scorpions and whip-scorpions. (See ARACHNIDA.) The false scorpions (order Pseudoscorpiones) are small Arachnida which resemble the true scorpions, but lack the long jointed tail. The abdomen is ovate and broader than the cephalothorax, and there is no poison sting. The jaws are fitted for sucking, but the palpi bear large pincers as in the true scorpions. There are two pairs of spiracles and two or four eyes, although some forms are blind. The female lays eggs which she carries attached to the first segment of the abdomen. The false scorpions are swift runners, moving sidewise and backward with equal facility. They feed on mites, psocids, and other minute insects and are found in moss, under the bark of trees, or between the leaves of dusty books. *Chelifer cancroides* is common in storerooms in old houses. They are often found attached to other insects, especially to flies. The whip-scorpions, or 'whiptails' (order Pedipalpi) are arachnids with a long body, segmented thorax, and a long whip-like appendage at the tip of the abdomen. The fore legs have many tarsal joints and are elongated and whip-like. The mandibles are furnished with claws and the palpi are very large and are armed with strong spines. The whip-scorpions are tropical in their distribution. One species (*Thelyphonus giganteus*) is found in the Southern United States, where it is known as the 'mule-killer,' 'vinaigrier,' or 'vinegarone,' the latter names derived from an acid secretion which has the odor of vinegar, and which is ejected by the creature when disturbed or alarmed. Although very dangerous in appearance, it is perfectly harmless to man. It feeds upon insects during its whole life, the adults destroying large grasshoppers and beetles.

Consult: Kingsley, *Standard Natural History* (Boston, 1884); Comstock, *Manual for the Study of Insects* (Ithaca, 1895); Lankester, "Limulus an Arachnid," in *Quarterly Journal Microscopical Science* (London, 1881); Laurie (ib., 1890).

SCORPION-FISH, or SCORPENE. A fish of the genus Scorpæna, typical of the Scorpænidæ (q.v.); specifically, the common market-fish of southern California (*Scorpæna guttata*), which is about a foot long, and brown, mottled, rosy, olive, and other tints.

SCORPION-FLY. Any one of the curious insects belonging to the order Mecoptera, which contains the single family Panorpidæ. Strictly speaking, the term 'scorpion-fly' should be restricted to the members of the typical genus Panorpa, which have the terminal segments of the abdomen elongate and very mobile, while the genital organs are curiously enlarged and modified. This tail-like structure is carried in a curved position over the back, somewhat after the manner of the true scorpions. The scorpion-flies have four wings, with many veins, and the head is prolonged to form a deflexed beak which is provided with palpi near the apex. The metamorphoses are complete. The larvæ are provided with legs and usually with numerous prolegs like the sawflies. The larvæ are carnivorous and live near the surface of the ground. They feed usually upon dead animals, including such soft-bodied insects as caterpillars and grubs. The representatives of the family in the United States are all contained in the genera Panorpa, Bittacus, and Boreus. The panorpas are very common insects in the midsummer in most parts of the United States. Some of them have spotted wings and are seen flying in the bright sunlight in places where tall herbage abounds. The genus Boreus is composed of wingless forms which look something like minute grasshoppers, and occur in the winter upon snow in the Northern States.

SCORZONE'RA (It., black bark). A rather large genus of plants of the natural order Compositæ, natives mostly of Europe and Asia. The common scorzonera or black salsify (*Scorzonera Hispanica*), a native of Southern Europe, has long been cultivated for its tapering black esculent roots about the thickness of a man's finger. The leaves are sometimes used to feed silkworms.

SCOTCH FANCY CANARY. See CANARY.

SCOTCH LAW. The most ancient records of this body of law indicate that its fundamental principles and institutions are very similar to those of Anglo-Saxon England. At a very early period, however, the jurisprudence of Scotland began to diverge from that of its southern neighbor. In England a system of national courts was established as early as the thirteenth century, whose decisions were reported and formed precedents for future cases. Not until the middle of the sixteenth century, however, did Scotland secure anything in the nature of a complete judicial system. A century earlier, it is true, a Court of Session had been established, consisting of certain persons named by the King out of the three estates of Parliament, and receiving its name from the fact that it was to hold a certain number of sessions annually at places to be named by the King. It was a court of first instance, in the main, and no appeal lay from its decisions. Its judges were so negligent in the performance of their duties, however, that it was abolished in 1532, and a new Court of Session and College of Justice instituted. Until the middle of the sixteenth century, therefore, there was no opportunity for the development of a national system of Scotch law. Nearly all litigation was conducted in local tribunals, of which the most important was the Sheriff's Court (q.v.). In these, local usages and customs were enforced, but a common law of the realm was not and could not be evolved. "A private transcript of Glanvil's *Treatise on the Laws of England*, altered so as to adapt it to the notorious prac-

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tice in Scotland, and feigned to have been compiled by order of David I.," appears to have been received by the Scotch Parliament and judges as a correct statement of their written law down to the opening of the sixteenth century. After the establishment of the College of Justice, the unwritten law of Scotland developed rapidly, although along lines quite different from those followed in England. The tribunal itself had been modeled not after any English court, but after the constitution of the Parliament of Paris. Its judges consisted of seven churchmen, seven laymen, and a president. After the Reformation clergymen were received as judges, until 1640; but since then only duly qualified advocates are appointed to this court, and their selection is a prerogative of the sovereign. The system of legal rules administered by this tribunal was not so much that of England as that of Rome. Scotch lawyers were educated in France or Italy or Holland, where the Roman civil law prevailed. Scotch judges had no such antipathy to that law, either in its original form or in the modified form in the canon law, as characterized the judges of England. As a result, modern Scotch law has a very large infusion of the principles of the Roman law. Even at present admission to the Faculty of Advocates is conditioned upon a successful examination in the Roman law, and no one not an advocate is qualified for a judgeship in the Court of Session unless he has passed such an examination.

Since the union of Scotland and England the tendency of legislation has been toward the assimilation of the legal systems of the two countries. Lord Cockburn declared in 1846 that "the improvements introduced or recommended in England by law reformers amount, in a really surprising number of instances, to little else than an approximation to the law of Scotland." While this is true, it is also to be said that the most recent legislation has modified many of the Scotch rules and brought them into accord with those of English common law. Notwithstanding the process of assimilation which has been going on for two centuries, nevertheless the two legal systems present many striking differences still. Some of the most important are the following:

The nomenclature is so different that a learned writer upon the topic has declared that an interpreter is generally required in case of consultations between English and Scotch lawyers.

In matter of substance, the two legal systems are quite as much at variance as in terminology. English law divides property into real estate and personalty. Scotch law classifies it as heritable or movable. Heritable property includes not only lands and all rights of or affecting lands, but various forms of personal property such as certain bonds; also chattels which the owner directs shall vest in his heirs. Movables are all kinds of property which go not to the heir, but to the executor. Again, English law requires that every contract not under seal must have a consideration, while "in Scotland it is not essential to the validity of an obligation that it should be granted for a valuable consideration, or, indeed, for any consideration, an obligation undertaken deliberately, though gratuitously, being binding." In English law, obligations are divided into those of contract (q.v.) and those in tort (q.v.). Scotch law classifies them as contracts (subdividing these in accordance with the Roman law into real and consensual), quasi-contracts, delicts, and quasi-delicts. Under the head of quasi-contracts it places certain obligations not so classed by the Roman law. Delict includes those torts of the English law which are also criminal offenses; while quasi-delict includes torts of negligence or imprudence. Consult: Paterson, *A Compendium of English and Scotch Law* (Edinburgh, 1865); Lorimer, *A Handbook of the Law of Scotland* (Edinburgh, 1894); Erskine, *Principles of the Law of Scotland* (Edinburgh, 1895); MacKenzie, *Studies of Roman Law, with Comparative Views of the Laws of France, England, and Scotland* (Edinburgh and London, 1898).

SCOTCH MUSIC. The music of Scotland is of the same general character as that of Ireland and Wales. (See CELTIC MUSIC.) The national melodies are generally considered to be of great antiquity. No musical manuscript of Scotch airs is now known to exist of an older date than 1627; and we have no knowledge when and by whom the early Scotch melodies were composed. Their disappearance seems to have been due first to the strong measures resorted to, about 1530, by both civil and ecclesiastical authorities, to put down all ballads reflecting on the Roman Catholic hierarchy, and afterwards to the ill-will shown by the dominant Presbyterians toward worldly amusements. The most valuable existing early collection of Scotch melodies is the Skene manuscript, in the Advocates' Library, noted down by Sir John Skene of Hallyards about the year 1630. It contains a number of native airs, mixed with some foreign dance-tunes—upward of a hundred in all. Many of the Scotch melodies exhibit beauties which the changes these airs have undergone have only tended to destroy.

Among the peculiarities which give character to the music of Scotland, the most prominent is the prevalent omission of the fourth and seventh of the scale, and consequent absence of semitones. Another characteristic is the substitution of the descending for the ascending sixth and seventh in the minor scale, as at the beginning of the air called *Adew, Dundee*, in the Skene manuscript. A very prevalent course of modulation is an alternation between the major key and its relative minor, the melody thus ever keeping true to the diatonic scale of the principal key, without the introduction of accidentals. The closing note is by no means necessarily the key-note, a peculiarity especially remarkable in the Highland airs, which, if in a major key, most frequently terminate in the second; if in a minor, on the seventh. Closes are also to be found on the third, fifth, and sixth. Among the printed collections of Scotch melodies with words, the most important is George Thomson's collection, with symphonies and accompaniments by Pleyel, Kozeluch, Haydn, Beethoven, Bishop, Hummel, and Weber (vols. i.-iv., 1793-1805; vol. v., 1826; and vol. vi., 1841), one distinguishing feature of which was the appearance of Burns's words conjoined with the old melodies of the country. Consult: Ballantine, "Historical Epitome of Scottish Songs," in Fulcher's *Lays and Lyrics of Scotland* (Glasgow, 1870); Stenhouse, *Illustrations of the Lyric Poetry and Music of Scotland* (Edinburgh, 1853). See BAGPIPE; PIBROCH; REEL.

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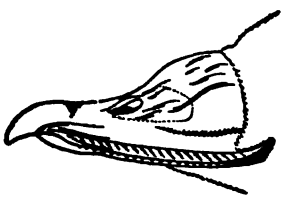
SCOTCH SCHOOL OF PHILOSOPHY. A term used to designate the philosophic tendency represented by Thomas Reid, Sir William Hamilton, James Beattie, James Oswald, Dugald Stewart, James McCosh, and others. The leading tenet of the school is that we have an immediate and intuitive knowledge of the external world and of first principles. See the articles on the above-named thinkers; also PHILOSOPHY, HISTORY OF.

SCOTCH TERRIER. See TERRIER; and Plate of DOGS.

SCOTCH VERDICT. The verdict of 'not proven' which the jury in a criminal trial in Scotland are permitted to find in certain cases. The defendant cannot be again tried on the same charge. See GUILT; VERDICT.

SCOTER (from Icel. *skoti*, shooter, from *skjōta*, OHG. *sciozan*, Ger. *schiessen*, AS. *scēotan*, Eng. *shoot;* ultimately connected with Skt. *skand*, to leap). A sea-duck of the genus Oidemia, of which there are several species, with tumid or gibbous bill and no frontal processes; the tail has 14 or 16 feathers. The male is black, sometimes with white on head and wings; the female sooty-brown. The largest American species is the white-winged scoter (*Oidemia Deglandi*), which is 22 inches long and is very similar to the Old World scoter (*Oidemia fusca*). The surf-scoter (*Oidemia perspicillata*) is a trifle smaller, and has no white on the wings. The American black scoter (*Oidemia Americana*) is still smaller (19 inches) and has no white on either head or wings. It is very similar to the European *Oidemia nigra*. These three American scoters are abundant in winter off the coast of New England and the Middle States. They feed on mussels and other mollusks, and are considered poor eating. All breed in high northern latitudes and lay from 5 to 10 eggs in nests on the ground.



BILL OF A SCOTER.

SCOTIA, skō'shȧ. The hollow or concave molding between the fillets of the tori of the base of Ionic, Corinthian, and derivative orders. (See BASE.) It is also called trochillus, but differs somewhat from the cavetto (q.v.) of the Romans.

SCOTIST. A follower of Duns Scotus (q.v.) in philosophy or theology. See SCHOLASTICISM.

SCOTLAND. A constituent member of the United Kingdom of Great Britain and Ireland. It occupies the northern portion of the island of Great Britain, together with three outlying groups of islands, the Hebrides to the west and the Orkney and Shetland islands to the northeast. Scotland is bounded by the Irish Sea, North Channel, Atlantic Ocean, and the North Sea on all sides except a comparatively short stretch on the southeast where it is contiguous to England. The whole is included between latitudes 54° 38′ and 60° 51′ N., the mainland terminating in latitude 58° 41′ N. The greatest extent of the mainland from Dunnet Head in the northeast to the Mull of Galloway in the southwest is 288 miles, and its breadth varies between 25 and 146 miles. The total area of Scotland, including the islands, is 29,785 square miles. A general discussion of the topographical, climatic, biological, and geological features of Scotland, together with those of England and Wales, is given under the title GREAT BRITAIN, reference to which is made also for each of the headings below.

Perhaps the most striking general feature of Scotland is its irregularity in outline. Though much smaller than England in area, it has a longer coastline, about 2300 miles, which gives a proportion of 1 mile to every 13 square miles of area. Few places lie 40 miles from the sea. The east coast is indented by two large arms of the sea, which almost cut the country into three sections, while the west coast is dissected by numerous fiords, or firths, which have converted many headlands into islands. Prominent among the firths are the Firth of Forth on the east, Moray Firth on the northeast, the Firth of Lorne and the Firth of Clyde on the west, and Solway Firth on the southwest border. Scotland differs from England topographically in that the greater part of its surface is mountainous, only the comparatively small south central portion being lowland. The lowlands of the south are divided from the highlands of the north by the broad short valleys of the Clyde and Forth. The former district resembles fertile England; the latter, a much more extensive region, is in the main bare and rugged and capable of supporting but a sparse population. The extreme southern part of Scotland is a region of mountains and hills, embracing fertile valleys. The best known range here is that of the Cheviot Hills, on the English border. Middle Scotland, extending from the Clyde and Forth valleys north to the Caledonian Canal, which connects Moray Firth with the Firth of Lorne, is almost exclusively mountainous, characterized by the Grampian Hills, and containing Ben Nevis, at the head of the Firth of Lorne, the highest mountain in Great Britain (4406 feet). The plain of Strathmore, however, the most extensive cultivated section in Scotland, lies in this division of the country, northeast of Stirling. Southeast and east of this plain are the Ochil and Sidlaw Hills. North Scotland—the northwestern Highlands—the poorest part of the country, is an upland of swamp, moors, and bald, barren features. The highest peak in this region is Ben Dearg, 3550 feet. The scenery here is highly picturesque and inspiring, being varied by castled elevations, lakes, valleys, glens, rivers, cascades, and rocky coasts. The highest peaks in South Scotland have an elevation of about 2700 feet. The rivers and lakes of Scotland are described under GREAT BRITAIN. Geologically Scotland is more thoroughly of ancient formation than England. In both the northern and southern highland regions little but Archæan gneisses and Lower Paleozoic metamorphic rocks remain, but in the central depression a large Carboniferous area containing rich coal fields still survives the long ages of denudation. Igneous rocks of all ages are also more common in all parts of the country than in England.

MINING. The annual production of coal is rapidly increasing. Considerably over half of it is mined in the County of Lanark. Other minerals are mined in much smaller quantities. Shale oil is procured in the lowlands, the value of the

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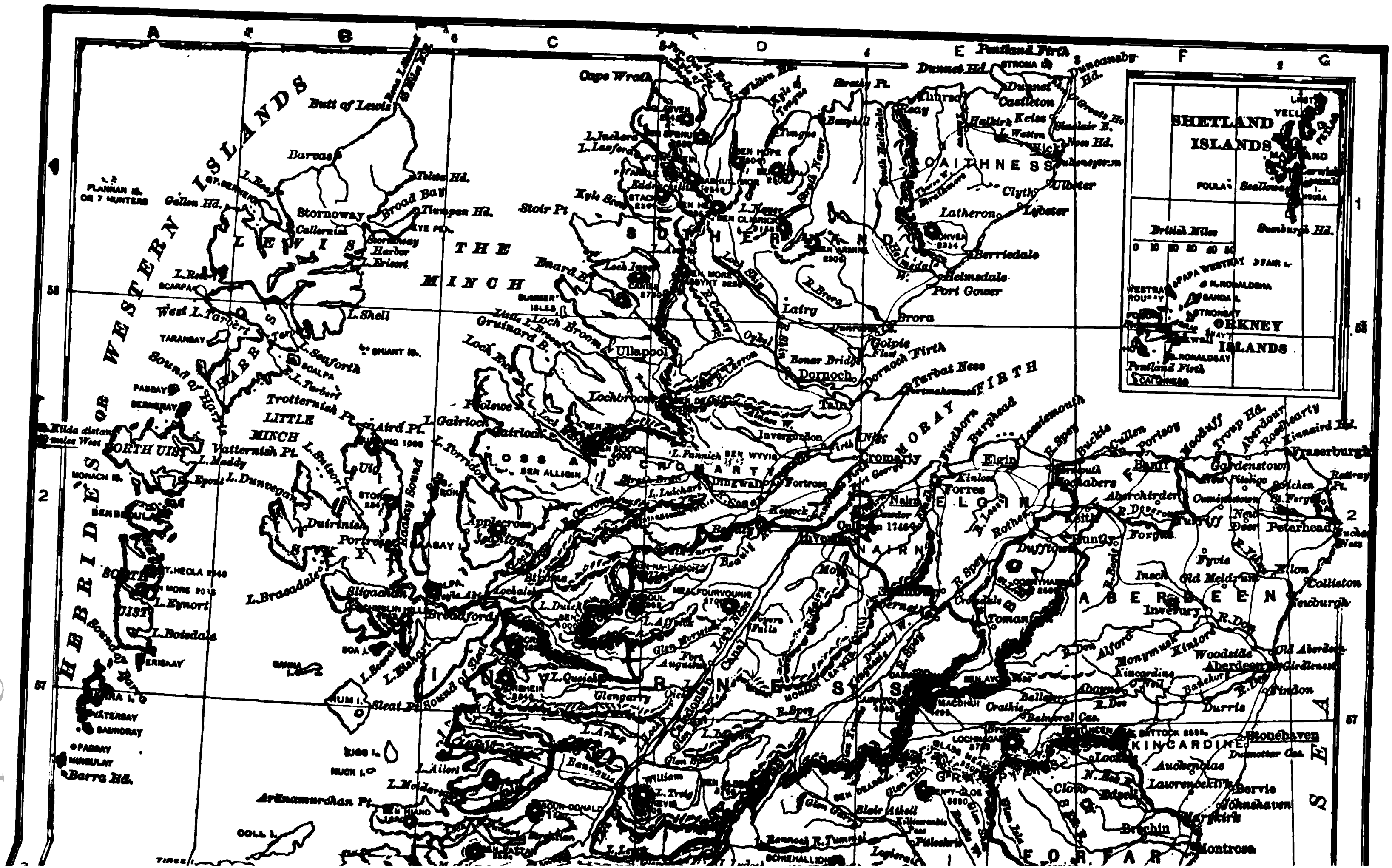

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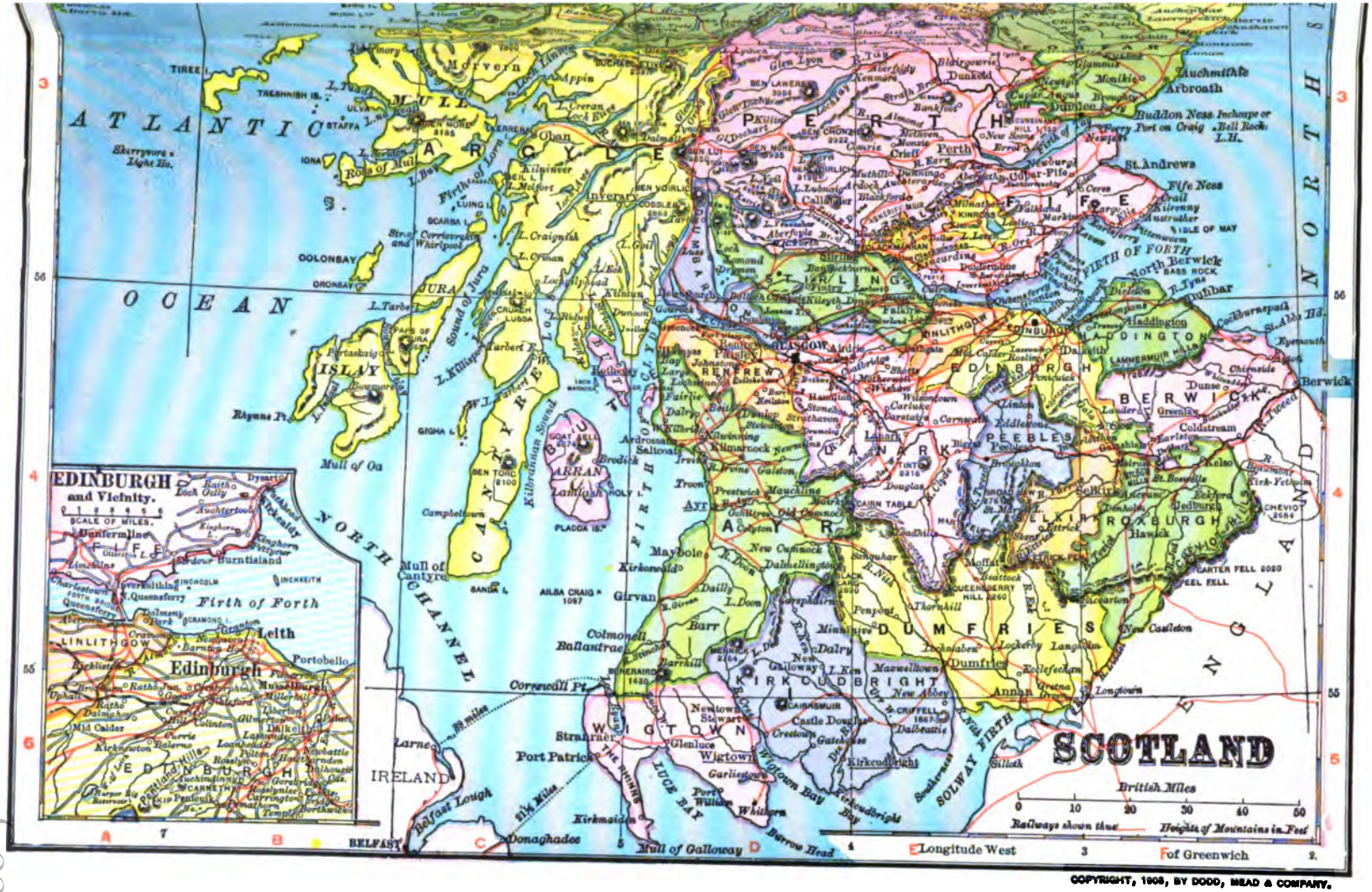

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output for 1900 having been £626,966; and iron ore is exploited, Ayrshire County producing the largest quantity. The total value of the iron ore mined in 1900 was £408,113. The value of the granite quarried in the same year was £381,244. Other mineral productions of some importance are fire clay, limestone, slate, and lead ore.

FISHERIES. The value of fish taken in 1901, £2,237,952, was a decided increase as compared with the value of the catch a decade earlier, but the catch was about the same. While there has been some decrease in net and line fishing, there was a fourfold increase in the amount of the catch by trawling. In 1900, 40,192 men were engaged on 11,275 fishing vessels. Considerably over one-half of the total catch is herring, the next most important varieties being haddock and cod. The fishing interest of the east coast is largely concentrated in Aberdeen. The large whaling fleet which formerly had its headquarters at Peterhead has dwindled into insignificance.

AGRICULTURE AND STOCK-RAISING. Owing to the extensive mountainous area, the development of agriculture is subject to very serious limitations. The cultivation of the soil is largely confined to the lowlands. The area under crops and in pasture increased from an average of 4,560,825 acres for the period 1871-75 to 4,900,131 in 1091, the increase being almost wholly in the permanent pasture land, which in that year amounted to 1,428,224 acres. Over three-fourths of the area devoted to cereals is in oats, the acreage of that crop in 1901 being 956,389. Barley is the only other important cereal crop. Much less attention is given to wheat than formerly. Green crops are extensively grown, but the total acreage of these has decreased in recent years, being 617,486 in 1901. Considerably over two-thirds was in turnips and swedes, which hold there a place as stock foods somewhat similar to that held by corn in the United States. Potatoes are also an important crop. The area in clover, sainfoin, and grasses under rotation in 1901 was 1,593,461 acres. A highly intensive system of cultivation is followed and an exceptional yield of all crops is secured. The size of farm holdings and the system of tenure are much the same as for England. (See GREAT BRITAIN, paragraph *Agriculture*.) Stock-raising is relatively very important. Extensive areas in the mountain regions are utilized for grazing. The country has long been noted for its sheep. Some of the best known breeds, such as the Cheviots, are natives of Scotland. The total number of sheep in 1901 was 7,401,409. In the same year the cattle numbered 1,229,281. Among the well-known native breeds of cattle are the Ayrshire, Galloway, Polled Angus, and Jersey. The Clydesdale horse is one of the best-known breeds of draught horses, while the Shetland ponies enjoy an equal distinction among ponies. In 1901 the horses numbered 194,893. But little attention is given to swine, which numbered only 124,821.

MANUFACTURES. In but few countries is there so large a per cent. of the population engaged in manufactures as in Scotland, in 1891 25.65 per cent. of the population being thus engaged. The history of the development of the industry has been in its main lines quite similar to its course in England. Scotland shares with that country the advantages of climate, of commerce, and of mineral wealth, and has contributed a goodly portion of the inventive genius, thrift, and business enterprise that have given Great Britain its high industrial rank. There are three groups or branches of manufacturing that have attained special prominence, namely, textiles, liquors, and iron and steel. Among the textiles, woolens, linens, and cottons are all important. Although Scotch woolens have been manufactured for centuries, they did not become prominent until the period of the revolution in the industry brought about by improved machinery in the early part of the nineteenth century. The woolens manufactured in the district of the Tweed are famous and their production has become important in a large number of towns. Other varieties that have become well known are tartans, plaids, and shawls. From 188 woolen and worsted factories with 233,533 spindles and 10,210 persons employed in 1850, there was an increase to 246 factories with 621,034 spindles and 22,667 persons employed in 1878, and to 282 factories with 639,724 spindles and 31,077 persons employed in 1890. No later figures on manufactures are available. The manufacture of linen had acquired large proportions as early as the seventeenth century, notwithstanding the attempts of the English to hinder its development. The industry profited much from the union with England and grew rapidly during the eighteenth century. In 1798 the value of the linen manufactures was estimated at £850,405. The greatest development in the industry was attained about 1867, when 77,195 persons were employed in 197 factories, in which there were 487,579 spindles. Following this, foreign competition has been more severe and the industry has not been in so prosperous a condition. In 1890 there were 34,222 persons employed in 136 factories in which there were 208,354 spindles and 18,599 power looms. The linen industry is widely distributed. The manufacture of cotton goods developed very rapidly in the latter part of the eighteenth century and the early part of the nineteenth. In 1861 there were 163 factories employing 31,237 persons, the spindles numbering 1,915,398, and the power looms 30,110. Little progress has been made since that period, the factories in 1890 numbering 124, employing 34,878 persons, and using 1,204,113 spindles and 28,093 power looms. Most of the cotton factories are located in Glasgow or its vicinity. In late years the weaving of lace and the manufacture of silks have grown into industries of some importance.

Distilling is probably the most thriving of the Scotch industries. Scotland is unrivaled in the reputation of its whisky. The production of this article increased from 5,108,373 gallons in 1824 to 20,164,962 gallons in 1884 and to 31,798,465 gallons in 1900, the output for the last year being considerably more than half the product for the United Kingdom. Scotland manufactures only a small fraction of the beer made in the United Kingdom, the output in 1900 being 2,137,030 barrels. The mining of iron and coal in the low country has given rise to the development in that section of a large iron and steel industry. It began in 1760 and by the middle of the nineteenth century it employed 13,296 persons. In 1900 1,156,885 tons of pig iron were produced, which was about one-seventh of the total for the United Kingdom. The production of steel ingots in West Scotland

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for the same year was 1,149,200 tons. Scotland has become widely known for its ship-building, the Clyde being the largest ship-building centre in the world. The vessels of the Cunard Line are built in the Clyde shipyards. There are also a number of other ship-building centres, but of much less importance. The industry, though subject to occasional checks, is growing. In 1901 376 vessels were built, having an aggregate tonnage of 554,406 tons. There is a large variety of less important industries such as the manufacture of chemicals, pottery, confectionery, and preserves, etc.

TRANSPORTATION AND COMMERCE. The railroad mileage increased from 2999 in 1884 to 3485 in 1900. The Caledonian Canal, connecting Moray Firth with Loch Linnhe and completed in 1847, served for a time as a ship canal, but as vessels became larger their transit through the canal became impossible, and it is now used mainly for purposes of local traffic. Some of the canals of the Lowland district have been superseded by railroads. The course of the Clyde River has been greatly improved, until ocean vessels can reach the city of Glasgow. This city is the principal port of Scotland. The total tonnage entered and cleared at its port in 1901, excluding the coastwise trade, was 3,825,890. Leith, the next most important port, was credited with a tonnage of 1,945,754 for the same year. These are followed at a distance by Dundee, Grangemouth, Greenock, and Aberdeen. In 1900 the total tonnage entering Scottish ports in the coastwise trade was 7,213,574, and in the colonial and foreign trade 5,657,200. The value of imports into Scotland in the foreign and colonial trade increased from £8,921,108 in 1851 to £31,012,750 in 1874, and to £38,691,245 in 1900. The value of the exports leaving Scottish ports increased from £5,016,116 in 1851 to £17,912,932 in 1874, and to £32,166,561 in 1900, Scotland having a large percentage of this trade. A considerable export trade not represented in these figures passes through the English ports. See the paragraph *Commerce* in the article GREAT BRITAIN.

FINANCE. Scotland is subject to the same fiscal system as are the other members of the United Kingdom, a discussion of which will be found in the article GREAT BRITAIN, paragraph *Finance*. For the fiscal year ending March 31, 1902, the amount contributed by Scotland to the revenue collected by Imperial officers was £16,055,000, of which £13,115,000 was collected from taxes. The largest item was the excise tax, productive of £4,326,000, followed by the income tax, £3,645,000; customs, £2,981,000; estate, etc., duties, £1,411,000; stamps, £604,000; land tax and house duty, £148,000. The non-tax revenue, chiefly from postal and telegraph services, amounted to £1,858,000, and the revenue derived from local taxation amounted to £1,082,000. The expenditure for Scottish services during the same year amounted to £5,059,000. The aggregate amount raised by local authorities for local purposes increased from £8,097,456 in 1890-91 to £13,804,788 in 1898-99.

For *Banks*, *Government*, and *Charitable and Penal Institutions*, see under GREAT BRITAIN.

POPULATION. The population of Scotland at the time of the Union in 1707 was estimated at 1,000,000. The first official census taken of the population in 1801 showed the inhabitants to number 1,608,420. By the middle of the century (1851) it had further increased to 2,888,742, in 1891 to 4,025,647, and in 1901 to 4,472,103. In the last of these years Scotland contained 10.8 per cent. of the total population of the United Kingdom, which was but slightly greater than the corresponding per cent. at the beginning of the nineteenth century. The density per square mile in 1901 was 149, as against 606 for England. The population, however, is very unevenly distributed, being quite sparse over the large Highland area, while the Lowlands, namely the Glasgow-Edinburgh region, is one of the most densely populated districts in Great Britain. Between 1891 and 1901 the town districts—places having 2000 inhabitants and over—increased in aggregate population from 2,925,080 to 3,367,280, while during the same period the mainland rural districts made only the slight gain of from 974,841 to 983,274, and the insular rural districts decreased in population from 125,726 to 121,446. The following table shows the growth of the larger cities:

	1861	1891	1901
Glasgow	394,864	618,052	735,906
Edinburgh	168 121	264,796	316,479
Dundee	90,417	155,675	160.871
Aberdeen	73,805	123,327	143,722

The following table gives the list of the administrative divisions of Scotland, their areas and populations.

DIVISIONS AND CIVIL COUNTIES	Area in sq. miles	Population	
		1891	1901
Shetland	551	28,711	28,166
Orkney	376	30,453	28,699
Caithness	686	37,177	33,870
Sutherland	2,016	21,896	21,440
Nairn	162	9,155	9,291
Elgin	477	43,471	44,800
Banff	630	61,684	61,488
Aberdeen	1,972	284,036	304,439
Kincardine	381	35,492	40,923
Ross and Cromarty	3,089	78,727	76,450
Inverness	4,211	90,121	90,104
Forfar	874	277,735	284,082
Perth	2,494	122,185	123,283
Fife	504	190,365	218,840
Kinross	82	6,673	6,981
Clackmannan	55	33,140	32,029
Stirling	451	118,021	142,291
Dumbarton	246	98,014	113,865
Argyll	3,110	74,085	73,642
Bute	218	18,404	18,787
Renfrew	240	230,812	268,980
Ayr	1,132	226,386	254,468
Lanark	879	1,105,899	1,339,327
Linlithgow	120	52,808	65,708
Edinburgh	366	434,276	488,796
Haddington	267	37,377	38,665
Berwick	457	32,290	30,824
Peebles	348	14,750	15,066
Selkirk	267	27,712	23,356
Roxburgh	666	53,500	48,804
Dumfries	1,072	74,245	72,571
Kirkcudbright	899	39,985	39,383
Wigtown	487	36,062	32,685
Total	29,785	4,025,647	4,472,103

The population of Scotland contains but a small number of non-Scots, amounting in 1900 to only 8.37 per cent. of the total. Considerably over half of these were Irish and the majority of the remainder were English. The foreign element amounted to only .21 per cent. of the total population. In the decade 1891 to 1900, 186,012 of the Scotch element left the United Kingdom for

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places out of Europe. Considerably over one-half of the Scotch emigrants in the last half of the nineteenth century went to the United States. Many of the Irish and the other non-Scotch elements residing in the country also have left for other lands. In 1901 the males numbered 2,173,151 and the females 2,294,849. In the same year the births numbered 132,178, the deaths 80,103. The numbers engaged in occupations according to the returns of 1891 were classified as follows: Professional, 111,319; domestic, 203,153; commercial, 180,952; agricultural and fishing, 249,124; industrial, 1,032,404; and the remainder or unproductive class, 2,248,655.

RELIGION. Scotland is the stronghold of Presbyterianism, and the mass of the population belong to that faith. The established branch of the Presbyterian Church includes about one-half of the Protestant Church population. In 1899 the congregations of this Church numbered 1447 and the membership 648,476. In 1900 the two branches—the Free Church of Scotland and the United Presbyterian Church of Scotland—were united under the name of the United Free Church of Scotland. Before the union the Free Church had 1109 congregations with 404,828 members and an additional 61,000 adherents, and the United Presbyterian had 589 congregations with 177,517 members. There are a number of other non-conforming bodies, but all of them small. The Episcopalian Church in 1899 had 356 congregations and over 114,000 communicants and other members. The Catholic population was estimated in 1898 at 413,000; it consists mainly of the Irish element.

EDUCATION. The supremacy of Scotland over the other parts of the British Isles in elementary and secondary education is generally admitted. In remarkable contrast with England, the country is distinguished for having early made public provision for instruction, and the religious controversies did not prevent the development of a homogeneous system. An act passed in 1696 obligated the landowners to the support of schools, and they with the ministers of the parishes had charge of the administration of the system. An educational committee reported in 1829 that their schools were open freely to Roman Catholics and that the teachers were directed not to press on them any instruction to which their parents or priests might object. Small Parliamentary grants to education began between 1830 and 1840. After 1861 it was only required of the teachers that they should not teach opinions opposed to the divine authority of the Scriptures or to the doctrine of the Shorter Catechism. By the Parliamentary Educational Act of 1872 the board system was established, in accordance with which a school board elected in every parish and burgh every three years has charge of both elementary and secondary education. School boards have the power of prescribing religious instruction, but the time of giving it must be such that children absenting themselves will not miss any of the secular instruction. Since 1891 instruction has been free for children from three to fifteen years of age and compulsory between the ages of five and fourteen, with conditional exemption after twelve. The instruction given in the parish schools has been mainly elementary, and secondary instruction was provided by the burgh schools and the academies. Unlike England, private boarding schools have never been widely patronized in Scotland. Burgh schools were established prior to the Reformation; they were regulated by the burgh authorities and open to the general community, but there was never any provision by national enactment for their organization or financial support. The desire for more modern or practical courses of instruction resulted about the middle of the eighteenth century in the establishment of academies. However, the opportunities to receive a university preparation were always, and still remain, in a measure inadequate, necessitating the assumption of that work by the universities themselves. A Parliamentary act was passed in 1887 making technical education possible.

In proportion to population Scotland has a larger number of universities and a much larger attendance than has England. The universities are Saint Andrews, founded in 1411; Glasgow, 1450; Aberdeen, 1494; and Edinburgh, 1582. The Scotch universities contrast strikingly with the older English universities in that the expense incurred in taking the course is much smaller in the former. Governmental financial support has never been very liberally extended, but has increased in recent years, which, together with the Carnegie gifts, has placed them upon a much better financial footing than ever before. Women are admitted to the universities under the same conditions as are men.

ETHNOLOGY. The people of Scotland, called Scots or Scotch after a Celtic tribe originally from Ireland, are derived from widely different stocks. The most primitive race were long-headed and they have been classed with Sergi's Mediterraneans. These were followed by a brachycephalic people like Ripley's Alpine race, but in Scotland they were tall, with massive jaws and broad faces. The third ingredient is a long-headed race, Teutonic, and of lofty stature. From the Stone Age until the eleventh century of our era there is evidence of a continuous Scandinavian invasion penetrating into the north country and entering largely into the composition of the Scotch Highlanders. They belong to the tallest people in the world, having an average height of 1.746 meters, in Ayrshire 1.782 meters, and in Galloway 1.792 meters; the cephalic index is 76.2-77.9. There are two centres of speech in Scotland. In the north Gaelic is spoken, belonging, with Irish and Manx, to the Gædhelic division of the Celtic mother tongue. In the south it is Lowland Scotch, an interesting local mixture of Scandinavian and English.

HISTORY.

At the end of the fifth century the Scots, an Irish people, settled in modern Argyll, and soon spread along the western coast from the Clyde to modern Ross. Their kingdom was called Dalriada. To the east of them, occupying the whole country north of the Forth, was the Pictish kingdom (see PICTS), and to their south lay the British Kingdom of Cumbria, which extended along the western coast from the Clyde to the border of Wales. The English Kingdom of Bernicia, a part of Northumbria, occupied the remainder of modern Scotland south of the Forth.

The early history of the Dalriad Scots is a narrative of warfare with the other kingdoms. Their first King of whom we have record, Fergus

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MacErc, is said to have come from Ireland in 502, with the blessing of Saint Patrick himself. The Dalriads were Christians, and their King, Conal, gave the isle of Iona to Saint Columba, the apostle of the northern Picts. Aidan, another of their kings, repeatedly invaded Bernicia, but was beaten by the heathen Ethelfried at Degastan in 603. There followed a short period of English supremacy over both Scots and Picts, but in the decisive battle of Nechtansmere (685) the latter destroyed an English army, and both peoples became independent. About 730 the Pictish King, Angus MacFergus, subdued both the Scots and the Britons. But internal dissensions and the attacks of the Northmen broke the strength of the Pictish kingdom, and in 843 Kenneth MacAlpin, King of the Scots, was acknowledged King of Pictland. All the country north of the Forth and the Clyde was thus united into one kingdom. It was at first called Alban, but in the tenth century the name Scotland became common. Kenneth I. (843-860) transferred his seat to Forteviot in Stratherne, the Pictish capital. By the marriage of his daughter to the King of Cumbria he secured an alliance of all the Celts of Scotland against the Teutonic invaders. He often raided Lothian, and repulsed the Northmen from Dalriada, but neither he nor his successors could prevent them from occupying the Orkneys and Shetlands, and from obtaining a foothold in the extreme north of Scotland.

The centre of the Scotch kingdom was the country between the Forth and the Spey, and its kings were constantly engaged in struggles with the rebellious chiefs of Moray. The seven original provinces of Pictland were ruled by underkings, but with the growth of the royal power these kinglets were replaced by *mormaers*, or great stewards, who were royal officers. The tribal chieftains under them were called *toisechs*. They, as well as the mormaers, were chosen in the assembly of the free tribesmen from the ruling family. Constantine II. (904-943) fixed the royal residence at Scone. In a national council held at Scone (906) he and his bishop, Cellach, regulated the affairs of the Scottish Church. He repeatedly repulsed the Northmen, but later in his reign formed an alliance with them and with Cumbria against the growing power of Athelstan of England. The allies were defeated in the great battle of Brunanburh (937). Constantine also succeeded in placing his brother Donald upon the throne of Cumbria. His successor, Malcolm I. (943-954), acquired the southern part of Cumbria (modern Cumberland and Westmoreland) from Edmund, King of England, who had conquered it. But the permanent southern borders of Scotland date from the reign of Malcolm II. (1005-34). The royal line of Strathclyde (northern Cumbria) having expired, that country had become a part of Scotland by inheritance. Even more important was the acquisition of Lothian, which Malcolm wrested from the English by his victory of Carham in 1018. Malcolm's attempt to set aside the Scottish law of the succession by the murder of the legitimate heir (i.e. his brother's son) led to the murder of his grandson, Duncan, by Macbeth, Mormaer of Ross and Moray. Shakespeare's wonderful tragedy has treated this event, but his sources were at variance with historic truth. Duncan was in reality an immature youth, and Macbeth, who had married the mother of the true heir and was his guardian, represented the legitimate succession. Far from being a cruel tyrant, he was an able monarch, whose reign of eighteen years was one of comparative peace and prosperity.

Feudal Age (1054-1286). The accession of Malcolm III. (1054), better known as Malcolm Canmore, marks the beginning of a new epoch in Scottish history. It was the age of the Anglo-Norman influence, of the introduction of the feudal system in Church and State, and of the foundation and growth of towns. Scotland left her Celtic isolation and entered the community of European nations. The long residence of Malcolm III. in England, and especially his marriage with the sister of Edgar the Atheling, rendered his sympathies English, and involved him in English affairs. He espoused their cause against the Norman conquerors, and received many of the victims of William's devastation of Northumberland as settlers in Scotland. His Queen, who was afterwards canonized as Saint Margaret of Scotland, used her great influence to bring the Celtic Church into the communion of Western Christendom by the assimilation of its usages to those of the Roman Church. On the death of Malcolm (1093) a Celtic reaction occurred. Donald Bane, the King's brother, was chosen to succeed him, and the English courtiers were driven out of Scotland. But English aid soon placed Malcolm's son Edgar on the throne, and during his reign (1097-1107), as well as during the reigns of his brothers Alexander I. and David I., the Anglo-Norman influence triumphed. Edgar's reign was marked by the permanent removal of the royal residence to Edinburgh, and by the loss of the Hebrides and part of the western mainland to the Northmen.

During the reigns of Alexander I. (1107-24) and David I. (1124-53) the feudal system was greatly strengthened in Scotland, both in Church and State. Nine bishoprics were created in place of the single bishopric of the Scots, although Saint Andrews continued to hold the primacy. Parishes were established and endowed throughout the country. Foreign ecclesiastics took the place of the Scotch monks, and stately new abbeys were founded, especially by David, who began the construction of Holyrood, Melrose, and the other principal abbeys of the Lowlands. Charters were introduced to take the place of ancient Celtic customs, the *mormaers* became earls, and the *toisechs* thanes—both royal officers holding their land from the King, who thus became the universal landowner, in place of the tribes. Alexander was still surrounded by Celtic lords, but David portioned out the Lowlands among Norman lords in direct feudal relation to the Crown. Nevertheless, the relation of the tenantry to the new lords was the same as it had been to the old, and there was no oppression of the lower classes, such as took place in the Norman conquest of England. The *visnet* was introduced to take the place of the old practice of compurgation. By this legal process, which was also called the judgment of the peace, every freeman obtained the right to be tried by his peers. The more serious crimes were withdrawn from the lesser courts and made pleas of the Crown. The peace thus became the King's peace, and was maintained by the sovereign in annual judicial circuits until the first half of the fourteenth century, when four justices were appointed to at-

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tend to the pleas of the Crown. These reforms were begun by Alexander, but carried out, for the most part, by David. The latter granted many new charters and privileges to the burghs, which grew and prospered during his reign. He prized peace, but his English possessions and relationships brought on war. As husband of the heiress of Northumberland, and brother of the Empress Matilda, he took part in the civil war between her and Stephen. Although defeated in the Battle of the Standard, near Northallerton (1138), he nevertheless attained the object of his ambition when he acquired the Earldom of Northumberland for his son Henry. His son William the Lion, who became King in 1165 on the death of his brother Malcolm, was taken prisoner in an invasion of England, and compelled by the Treaty of Falaise (1175) to swear fealty to Henry II. Scotland remained a feudal dependency for fourteen years, but Richard I. of England renounced the treaty for 10,000 marks of silver. William's son, Alexander II., succeeded him and followed his father's policy of siding with the barons of England in their struggle against John. In 1237, however, he renounced his claims to Westmoreland, Cumberland, and Northumberland for a yearly payment of £200. His successor, Alexander III., recovered the western islands from the Northmen by a formal treaty in 1266, though the question had really been decided in the battle of Largs three years earlier. He then married his daughter to the young King of Norway, and her only child, the Maid of Norway, was declared heiress to the Scotch throne. The death of Alexander III., in 1286, ended this long and prosperous epoch.

War of Independence (1286-1328). The feudal relations of Scotland and England have given rise to much controversy between the historians of the two countries. The facts of the case seem to be that while the English kings usually claimed an overlordship, they had never succeeded in enforcing it except in the case of William the Lion noted above. The Scottish kings did homage for their English possessions and for them only. In 1290, however, Edward I. obtained a favorable opportunity to press the English claims. The Maid of Norway, granddaughter of Alexander III., died on the voyage to Scotland. Thirteen claimants to the throne appeared. Edward I. took the matter into his own hands, claiming this right as suzerain of Scotland. He demanded an acknowledgment of his suzerainty, which was acceded to by the Norman lords and bishops. The Scotch commonalty, however, that is to say, the burghs and the gentry, protested, but without avail. At Norham, in 1293, Edward decided in favor of John Baliol (q.v.), a descendant of the royal house by an elder female line. Baliol was a submissive man, but by his high-handed enforcement of feudal claims Edward drove Scotland to revolt, and to a league with France—the 'auld alliance' with France which lasted over two centuries and a half and was only ruptured by the Reformation. Edward, therefore, invaded Scotland in 1296 and in the battle of Dunbar defeated the Scotch forces. Baliol was deposed and the Norman nobility of Scotland readily swore fealty to Edward as their King.

But the Scotch people were unsubdued, and they soon found a leader in William Wallace (q.v.). After a series of remarkable adventures he succeeded in arousing the country against the English, and in the battle of Stirling (1297) he destroyed a superior English army. But in 1298 Edward returned with an overwhelming army, and by a new and skillful use of his archers defeated the Scotch at Falkirk. Nevertheless, although Edward repeatedly invaded Scotland, and although in 1305 Wallace was captured and cruelly put to death, the country was not subdued. After the death of Wallace the cause of liberty was taken up by Robert Bruce (q.v.), the grandson of Robert Bruce, Baliol's rival for the throne of Scotland. The nobility supported him as it had never supported Wallace, and he was crowned King at Scone. He gained a series of minor victories over the English, and at length completely routed their superior army at Bannockburn in 1314. From that time until 1328, when the independence of Scotland was formally acknowledged, there were constant invasions of Northern England.

During the War of Independence the Parliament of Scotland first took its definite form. Its origin is to be found in the feudal council of tenants-in-chief summoned by David I. which superseded the council of the seven mormaers. To the feudal council belonged the lords spiritual (bishops, abbots, priors), and the lords temporal, including the lesser, as well as the greater, barons. With the towns the kings negotiated directly in two groups—the four burghs of the south, of which Edinburgh was the leader, and the Hanse burghs of the north, grouped about Aberdeen. The burghs first appear as an estate in the Parliament of Cambuskenneth, which Bruce called, in 1326, to aid him in the struggle against England. From this date only can we speak of a Scottish Parliament. The three estates sat in the same house, under the presidency of the Chancellor of the Exchequer. The Scotch Parliament, however, never attained the constitutional importance of the English, because the Scotch kings lived within their means, and seldom made demands for money.

Supremacy of the Nobility (1329-1546). In Scotland the nobility was far more powerful than in England. There were many more exemptions from royal judicature, and the royal office of sheriff had become hereditary among the nobility. The prevalence of the tribal system in the Highlands, and to some extent in the Lowlands, strengthened the nobility, because of the intimate personal relation which existed between tribesmen and chief. Moreover, Scotland was unfortunate during the period following the struggle for independence in having most of her kings succeed as minors. During the minorities disorders and feuds prevailed, and peace existed in the royal burghs only. To disorder at home was added almost perpetual warfare on the English border—a dreary chronicle of raids and petty victories on either side. Under David II., the son of Robert Bruce (1329-71), Parliament attained its greatest power, practically conducting the affairs of State, and determining the succession to the throne contrary to the King's desire. In 1371 Robert II., a grandson of Robert Bruce, inaugurated the Stuart dynasty. During the latter part of his reign, which ended in 1396, the Duke of Albany was virtual ruler of Scotland, a position which he held under Robert III. (1396-1406) and during the minority of James

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I. (1406-37). It was not until some years after his death that James I., who had been prisoner in England since 1405, was permitted to return. James was a prince of great ability. With a strong hand he curbed the nobility, not hesitating to attain his ends by putting to death his opponents. In his attempt to bring order into Scotland he was aided by the towns. He also sought to make Parliament an instrument to crush the nobility. Finding it impossible to induce the lesser nobility to attend Parliament, he ordained in 1427 that two representative knights should be sent from each sheriffdom in the kingdom, on the model of the English system. This act was unsuccessful, but it became of constitutional importance, because it was reenacted by the Reformation Parliament in 1560, and in 1585 was finally established as a law.

During the following reigns there was more lawlessness than ever. Some of the nobility were always engaged in treasonable negotiations with England. Chief among the King's opponents had always been the Lords of the Isles, who ruled over what was practically an independent principality in the west. The great House of Douglas, famous in border raids, was also very troublesome. Under James II. (1437-60) there was some wise legislation improving the condition of the lesser tenantry and encouraging tillage. The marriage of James III. (1460-88) with the daughter of the King of Norway brought the Orkneys into the possession of Scotland in 1469. James IV. (1485-1513) married Margaret Tudor, the daughter of Henry VII., thus opening the way to peace with England. But family quarrels with Henry VIII. and the renewal of the French alliance led to a Scottish invasion of England, which resulted in the defeat and death of James on Flodden Field in 1513. Under James V. (1513-42) the College of Justice, the Scottish supreme court, was established on the model of the Parlement of Paris in 1532. James's chief minister was Cardinal Beaton, the Archbishop of Saint Andrews, who played in Scotland the rôle of Cardinal Wolsey in England, but with greater success. After the death of James V. he directed the destinies of Scotland. Henry VIII.'s barbarous invasion, in which towns were burned, the country was laid waste, and all the inhabitants that resisted were slain, thwarted that monarch's design for a marriage between the infant Queen of Scotland and the heir to the English throne. For a time the same policy was continued by the Protector Somerset, and this so incensed the Scotch that Mary was sent to France to marry the Dauphin. With the assassination of Cardinal Beaton in 1546 the power of the Catholic Church in Scotland was over.

THE REFORMATION AND ITS CONSEQUENCES (1543-1688). James V., although he compelled the clergy to reform abuses, resisted the efforts of Henry VIII. to make him join the Reformation, but after his death Mary of Guise, the Queen mother, in vain attempted to compromise. In 1559 John Knox (q.v.) returned to Scotland and became the greatest power in effecting the Reformation. Urged by his fiery eloquence, many of the nobility organized against the bishops under the name of the Lords of the Congregation. They went through the land suppressing the mass, destroying images, and plundering the monasteries. The Regent secured French aid, but with the assistance of Elizabeth the rebellious nobles more than held their own. Peace came in 1560 with the Treaty of Edinburgh, which provided for the withdrawal of both French and English forces, leaving Scotland to settle her own Church affairs. In that year the Reformation Parliament assembled and adopted a thoroughly Calvinistic Confession of Faith drawn up by John Knox, and established the Church on a democratic and Presbyterian basis. See PRESBYTERIANISM, section on *The Presbyterian Churches in Scotland.*

The subsequent history of Scotland until the Union is the story of its Church, the democratic government of which, like the Parliament in England, trained the people for political liberty. During the Civil War the Scots united with the Parliamentarians and by creating a diversion in the north divided the King's forces. The restoration of Charles II. was followed by the restoration of episcopacy and the bloody persecution of the Covenanters, who adhered to the Presbyterian faith. But the nation remained Presbyterian, and in 1689 the Scottish Parliament passed a bill of rights more radical than the English, and invited William to ascend the throne. In 1690 episcopacy was definitely abolished and Presbyterianism was restored to the position of a State religion. The frequent changes in religion were brought about by acts of Parliament, which was entirely under the King's control. A chief source of Parliamentary weakness lay in the growth of the committee system. As early as the fourteenth century business had been referred to two committees called the Lords of the Articles, chosen from the three estates. Consolidated by James V. into a single body, this committee obtained such power that by the sixteenth century Parliament met merely to confirm its decisions. In 1621 a change in the method of its appointment enabled the King to fill it with his partisans, and thus control Parliament. But in 1690 the committee of the Articles was abolished, and from that time until the Union Scotland had parliamentary rule.

THE UNION WITH ENGLAND. In consequence of the massacre of Glencoe in 1692, and of the hostile attitude of the English Parliament toward the Scottish colony at Darien, the Scottish Parliament echoed the popular feeling of hostility toward England. It met the English desire for union with the demand for free trade and equal rights in the colonies, and on being refused this it passed the Act of Security (1703), practically excluding the successor of Queen Anne from the Scottish throne, and providing for compulsory military training of every Scotsman. In retaliation the English Parliament passed several laws greatly restricting the trading privileges of the Scotch. For a year or two there was imminent danger that the Scots would proceed to extreme measures, but in 1707 the Parliament agreed to the Act of Union. Charges of bribery were made and the whole proceeding was execrated by the people of Scotland. As finally passed the act gave Scotland a representation of forty-five in the British House of Commons and sixteen in the House of Lords, the whole Scotch peerage electing the latter for the Parliamentary term of the British Parliament. Scotland received free trade and retained her own Church and laws. The debts of the two countries were consolidated.

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The history of Scotland since the Union cannot be separated from that of Great Britain (q.v.). The most important change that has come over the country is its transformation from an agricultural to an industrial community. A disastrous change in the land tenure and population of the Highlands occurred as a result of the gallant participation of the clans in the Jacobite rebellion of 1745-46. The Highland language and customs were suppressed by law, and the tribal ownership of land was abolished. As a result the lords converted the common lands into sheep walks and deer parks, compelling the tribesmen to migrate, unless they wished to remain as tenants at will, under wretched conditions. These evils were only in part remedied by the Crofters Act of 1880.

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SCOTLAND, CHURCH OF. See PRESBYTERIANISM.

SCOTLAND YARD. A building at the southeastern corner of Charing Cross, London, England, long famous as the headquarters of the Metropolitan Police Force. It derives its name from a palace assigned from the time of Edgar to Henry II. as the residence of the Scottish kings whenever they should desire to visit London. New Scotland Yard, the police headquarters since 1890, is on the Thames Embankment.

SCOTS GREYS. The oldest dragoon regiment in the British Army. It was raised in Scotland in 1683 and is mounted entirely on gray chargers. Throughout its history it has been one of the most distinguished regiments in the British service. The uniform differs from the other British dragoon regiments, in that bearskin busbies (q.v.) are worn instead of the dragoon helmet. Its present title is the Second Dragoons, Royal Scots Greys regiment of cavalry.

SCOTT, AUSTIN (1849—). An American educator, born in Maumee, Ohio. He graduated at Yale in 1869, spent a year in graduate study at the University of Michigan, and in 1871-73 studied history at Berlin and Leipzig. From 1873 to 1875 he was instructor in German at the University of Michigan; became in 1876 an associate in history in the newly established Johns Hopkins University, where he organized and directed the seminary of American history. During this period he also assisted George Bancroft in collecting and arranging the material for his *History of the Constitution of the United States*. In 1883 he became professor of history and economics at Rutgers College, New Brunswick, N. J., and in 1890 succeeded Merrill E. Gates in the presidency of the institution.

SCOTT, CHARLES (1733-1813). An American soldier, born in Cumberland County, Va. He served as a non-commissioned officer under Braddock in 1755, was captain of the first company in the Revolutionary War raised south of the James, became a colonel in August, 1776, distinguished himself at Trenton, and in April, 1777, was made a brigadier-general. In 1780 he was taken prisoner at Charleston, and was not exchanged until the close of the war. Removing to Kentucky in 1785, he served as brigadier-general under General Saint Clair in 1791, and in 1794 was one of Wayne's officers at the battle of Fallen Timbers. He was Governor of Kentucky from 1808 to 1812.

SCOTT, CLEMENT (1841-1904). An English journalist and author, born in London, October 6, 1841, and educated at Marlborough School. He entered the War Office as clerk in 1860, and retired on a pension in 1877. He then joined the editorial staff of the *Daily Telegraph*, to which paper he had contributed dramatic criticisms since 1872. He subsequently became editor of a critical weekly called *The Free Lance*. He is the author of *Lays of a Londoner* (1882); *Lays and Lyrics* (1888); *Round About the Islands* (1886); *Poppy Land Papers* (1886); *Pictures of the World* (1894); *Among the Apple Orchards* (1895); and *Sisters by the Sea* (1897), all delightful sketches. He is author, or part author, of the following plays: *Diplomacy; The Vicarage; Off the Line; The Cape Mail; Peril; The Crimson Cross; Odette; Tears, Idle Tears;* and *Sister*

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Mary. His work in fiction is represented by *Stories of Valour and Adventure* (1893), and *Madonna Mia, and Other Stories* (1898). His dramatic criticisms include *From "The Bells" to "King Arthur"* (1896); *The Drama of Yesterday and To-Day* (1899); *Ellen Terry* (1900).

SCOTT, DAVID (1806-49). An English historical and portrait painter, etcher, engraver, and author, born at Edinburgh. He exhibited his first picture, the "Hopes of Early Genius Dispelled by Death," at the Scottish Academy in 1828. In 1832 he visited Italy, making a short stay in Paris, where he was much impressed by the works of David, and from there going to Rome, he returned to Edinburgh in 1834. Although an artist of undoubted merit, he failed to win the appreciation of the public. His feverish and eager haste to portray his ideas hampered him in his use of color, and one must look to his work as a draughtsman to find the true interpretation of his genius. Among his designs are his *Monograms of Man* (1831), a set of six remarkable etchings somewhat resembling those of Max Klinger, and drawn in delicate outline on copper, and his designs for Coleridge's *Ancient Mariner*, begun in the same year, published in London (1837), a series characterized by vivid imagination and great power. Most of his paintings are in private collections in Scotland. The National Gallery of Edinburgh possesses the "Vintager" and "Ariel and Caliban." Other paintings include: "Achilles Addressing the Manes of Patroclus," Sunderland Art Gallery; "Vasco da Gama," Trinity House, Leith; the "Descent from the Cross," Smith Institute, Stirling; and portraits of Dr. John Brown and of Emerson (Public Library, Concord, Mass.). Scott's last works were the 40 illustrations to *Pilgrim's Progress*, and a series of 18 beautiful designs to Nichol's *Architecture of the Heavens*, both issued after his death. Consult W. B. Scott, *Memoir of David Scott* (Edinburgh, 1850).

SCOTT, DUNCAN CAMPBELL (1862—). A Canadian poet, born in Ottawa, Ontario. He was educated at Stanstead Wesleyan College. Having entered the Canadian civil service as a third-class clerk in 1879, he rose rapidly to the position of chief clerk and accountant (1893). His published verse comprises *The Magic House* (1893) and *Labor and the Angel* (1898). *The Village of Viger* (1896) is a collection of ten short stories of Canadian country life. See CANADIAN LITERATURE.

SCOTT, EDWARD JOHN LONG (1840—). An English scholar and author, born in Bridgewater, Somerset. He graduated at Lincoln College, Oxford, in 1862, in 1863 entered the manuscript department of the British Museum, and in 1888 was appointed keeper of the manuscripts and Egerton librarian. His publications include: *Introduction to Reprint Eikon Basilike* (1880); a translation in verse of the *Eclogues of Vergil* (1884); *Private Diary of Shakespeare's Cousin, Thomas Greene, Town-Clerk of Stratford-on-Avon* (1883); *William Harvey's Original Lectures on the Circulation of the Blood* (1886).

SCOTT, Sir GEORGE GILBERT (1811-78). An English architect. He was born at Gawcott, Buckinghamshire, and in 1827 was articled to a London architect. Converted by the writings of Pugin, he became a leading spirit of the Gothic revival, and was employed in restoring many of the old English cathedrals, including Westminster Abbey and Ely Cathedral, and in building churches. Prominent among his secular edifices are the Albert Memorial, and the ministerial buildings of the War, Foreign, Home, and Colonial offices. He became a member of the Royal Academy in 1861, and was made professor of architecture, his collection of lectures being published under the title *Mediæval Architecture* (2 vols., London, 1879). He won the gold medal of the Royal Institute of British Architects in 1859, was president of that body (1873-76), and was knighted in 1872. He died in South Kensington, March 27, 1878, and was buried in Westminster Abbey. Consult his *Recollections* (London, 1879).

SCOTT, HUGH LENOX (1853—). An American soldier, born at Danville, Ky. He graduated at West Point in 1876, and entered the cavalry. He saw service in Indian campaigns and was assigned to Western posts. In 1892 he enlisted an Indian troop in the Seventh Cavalry, and commanded it until all Indian troops were mustered out of service in 1897. In the war with Spain he was an adjutant-general in the First Army Corps, holding that office until February, 1899. He then served for fourteen months as adjutant general of the Department of Havana, after which he became successively assistant adjutant-general, and adjutant-general of the Department of Cuba. Besides reports on the Plains Indians, he wrote a monograph on the sign language of the Plains Indians, published in the *Proceedings* of the Folk Lore Congress of the World's Fair at Chicago in 1893.

SCOTT, HUGH STOWELL (1862-1903). An English author, born at Newcastle-upon-Tyne. He was better known by his pseudonym, Henry Seton Merriman. He published *Phantom Future* (1899); *Suspense* (1890); *Prisoners and Captives* (1891); *Slave of the Lamp* (1892); *With Edged Tools* (1894); *Grey Lady* (1895); *The Sowers* (1896); *In Kedar's Tents* (1897); *Flotsam* (1898); *Roden's Corner* (1898); *Isle of Unrest* (1900); *Velvet Glove* (1901); *The Vultures* (1902).

SCOTT, IRVING MURRAY (1837-1903). An American shipbuilder and iron-master, born in Hebron Mills, Baltimore County, Md. He entered the employ of the Union Iron Works of San Francisco as draughtsman in 1858. He designed much mining machinery, notably that for the Comstock mine. On his suggestion as general manager the Union Iron Works added in 1884 shipbuilding to the construction of mining machinery, and built for the United States Government the *Charleston*, *Oregon*, *San Francisco*, *Olympia*, *Wisconsin*, and *Ohio*. He was a trustee of Leland Stanford, Jr., University, and a prominent figure in the Republican Party of the Pacific Coast, his name being urged for the Vice-Presidential nomination in 1900.

SCOTT, JOHN MORIN (1730-84). An American patriot, soldier, and legislator, born in New York. He graduated at Yale in 1746, became prominent as a lawyer in New York, and was conspicuous as an early opponent of the British Ministry, being one of the organizers of the Sons of Liberty. In 1775 he became a member of the New York General Committee, served in the Provincial Congress in 1775-76, and, as brigadier-general, took part in the battle of Long Island. In 1777 he resigned his commission, and subse-

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quently served as Secretary of State of New York in 1777-79, and as a member of the Continental Congress in 1780-83.

SCOTT, JULIAN (1846-1901). An American battle and figure painter, born in Johnson, Vt. He served in the Federal Army from 1861 until 1863, and afterwards studied art in the National Academy of Design, and under Leutze. He was elected an associate of the Academy in 1871. His works, mainly taken from Civil War subjects, include: "Rear Guard at White Oak Swamp" (Union League Club, New York City); "Capture of André" (1876); and "In the Cornfield at Antietam" (1879).

SCOTT, or **SCOT,** MICHAEL (c.1175-c.1234). A famous mediæval scholar, who probably belonged to a family on the Scottish border. He received his education at the universities of Oxford, Paris, Bologna, and Palermo, and spent most of his later life at the Court of the Emperor Frederick II. in Sicily, where he was one of the most famous of the group of scholars collected around that enlightened monarch. He was in high favor with both Honorius III. and Gregory IX., who gave him various benefices, probably in Italy. In 1230 he visited Oxford, taking with him works of Aristotle and various commentaries. There are very few other facts about his life which can be regarded as authentic. Of his printed works, the best known are *Liber Physiognomiæ Magistri Michaelis Scoti* and *Mensa Philosophica*, translated into English and frequently printed under the title of *The Philosopher's Banquet*. In addition he made various translations of Aristotle's works and the Arabic commentaries. He also wrote works on astronomy and alchemy. As was so often the case in the Middle Ages with famous scholars, Michael Scott became known soon after his death as a magician, and as such he has figured extensively in literature. Sir Walter Scott has caused the action of his *Lay of the Last Minstrel* to centre about the traditional grave of Michael at Melrose Abbey. Consult Brown, *Life and Legend of Michael Scot* (Edinburgh, 1897).

SCOTT or **SCOT,** REGINALD (c.1538-99). A writer against witchcraft, son of Richard Scot of Scots Hall at Smeeth, in Kent. In 1555 he entered Hart Hall, Oxford, but left without a degree. He passed his life in Kent as a country gentleman. His famous work, *The Discoverie of Witchcraft* (1584), was designed to demonstrate the absurdity of the prevalent belief in witchcraft. Besides being full of learning, it is marked by passages of sound sense and humane feeling, qualities that naturally excited the antipathy of King James, who replied in his *Dæmonology* (1597). On coming to the English throne, James ordered Scott's book to be burned. Scott also published a valuable book entitled *A Perfect Platform of a Hop Garden* (1574). The *Discoverie* was edited by Brinsley Nicholson (London, 1886).

SCOTT, RICHARD WILLIAM (1825—). A Canadian statesman, born in Prescott, Ontario. He was admitted to the bar in 1848, and from 1857 to 1863 sat in the Canadian Assembly. In 1867-73 he was a member of the Ontario Assembly, of which he was elected Speaker in 1871. From 1872 to 1873 he was Commissioner of Crown Lands, and from 1873 to 1878 Secretary of State. He was acting Minister respectively of Finance in 1874, of Inland Revenue in 1875-76, and of Justice in 1876. He carried through the separate Catholic school law of Ontario Province, and the Canada local option temperance act, generally styled the 'Scott act.' In 1874 he was elected to the Dominion Senate, and in 1896 became Secretary of State.

SCOTT, ROBERT (1811-87). An English clergyman and scholar. He was born at Bondleigh in Devonshire, and educated at Shrewsbury School and at Christ Church, Oxford, where he won the Craven and Ireland scholarships. He took his degree in 1833 and won a fellowship at Balliol two years later. Meantime, in 1834, he had taken holy orders, and held various ecclesiastical preferments until 1854, when he was elected master of Balliol in opposition to Jowett, who was to be his successor. In 1870 he accepted the deanery of Rochester and held it until his death. Scott's name is most widely known by his joint authorship, with H. G. Liddell, of the great Greek-English lexicon, whose appearance in 1843 was epoch-making for English scholarship. For the next forty years Liddell and Scott worked diligently at revision and addition, until the seventh edition (1883) was practically an original work, though the first had been based on the German lexicon of Passow.

SCOTT, ROBERT HENRY (1833—). A British meteorologist, born in Dublin, Ireland, and educated there at Trinity College, and in Berlin and Munich. He was keeper of the mineralogical museum of the Royal Dublin Society from 1862 to 1867, when he became director of the British Meteorological Office, a post which he held until 1900. He wrote: *Volumetric Analysis* (1862); *Weather Charts and Storm Warnings* (1876; 2d ed. 1887); and *Elementary Meteorology* (1883).

SCOTT, ROBERT KINGSTON (1826-1900). An American soldier and politician, born in Armstrong County, Pa. In 1861 he was chosen lieutenant-colonel of the Sixty-eighth Ohio Regiment, and next year was promoted colonel. He fought at Fort Donelson, Shiloh, and Corinth, was in the campaign against Vicksburg, was taken prisoner near Atlanta in 1864, but was shortly afterwards exchanged, and served during the remainder of the war with General Sherman. From 1865 until 1868 he was assistant commissioner in South Carolina of the Freedmen's Bureau. In the latter year he was elected Governor of the reconstructed State, and in 1870 was reelected for the ensuing term of two years. His administrations were very corrupt, and during them the State debt increased about $13,000,000, although few public improvements were made. In his second administration Ku Klux disorders became so numerous in some parts of the State that President Grant, under the authority conferred by the Enforcement Act of April 20, 1871, suspended the writ of habeas corpus in some of the counties, and many of the offenders were tried by the Federal courts. In 1877 Scott settled in Napoleon, Ohio. In 1881 he was tried for shooting and killing W. G. Drury, but was acquitted on the plea that the shooting was accidental. For accounts of his administrations in South Carolina, consult: Pike, *The Prostrate State* (New York, 1874); and *Why the Solid South?* by Hilary A. Herbert and others (Baltimore, 1890).

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SCOTT, THOMAS (1705-75). An English hymn-writer, son of an Independent minister of Hitchin, in Hertfordshire. He began preaching when a young man and afterwards held various appointments in Norfolk and Suffolk. Best known of his hymns are "Happy the Meek" and "Hasten, Sinner, to be Wise." Consult his *Lyric Poems, Devotional and Moral* (1773). He also turned into English verse *The Table of Cebes* (1754) and *The Book of Job* (1771). His sister, ELIZABETH SCOTT (1708?-76), likewise wrote many hymns, several of which are still used. To her belongs "All hail, Incarnate God."

SCOTT, THOMAS (1747-1821). An English Bible commentator. He was born at Braytoft, Lincolnshire, and spent the early years of his life as a grazier. In 1773 he was ordained priest and became curate in Buckinghamshire; he succeeded John Newton, curate of Olney, in 1781; was chaplain to the Lock hospital in 1785; and rector of Aston Sandford in 1803. Among his publications are: *The Force of Truth* (1779); *The Articles of the Synod of Dort*, translated (1818); and his commentary on the Bible (1788-92), which had immense circulation and influence in its day. His collected works appeared in 10 volumes (1823-25), and his *Letters and Papers* (1824), edited by his son, who also wrote his *Life* (1822), including in it a valuable autobiographical fragment.

SCOTT, THOMAS ALEXANDER (1824-81). An American railroad manager, born at Loudon, Pa. Entering the service of the Pennsylvania Railroad in 1851, he was rapidly promoted, and in 1859 became vice-president. In 1861 he was appointed by President Lincoln Assistant Secretary of War, in which capacity he rendered invaluable services by reorganizing the entire system of transportation. Returning to the service of the Pennsylvania Railroad, he inaugurated the policy of securing control of Western railway lines for operation in connection with the Pennsylvania system. He was president at different times of various railroad lines, and from 1874 until a short time before his death was president of the Pennsylvania Railroad.

SCOTT, Sir WALTER (1771-1832). A famous British novelist and poet. He was born in Edinburgh, August 15, 1771, of an old border family, the Scotts of Harden, an offshoot from the House of Buccleuch. Although he grew to be healthy, as a child Scott was sickly; but he grew to be very tall, with bright eyes, a sturdy chest, and powerful arms, and he was thought good-looking. His childhood was passed for the most part at Sandy Knowe, the farm of his grandfather, in Roxburghshire. His early familiarity with the ballads and legends then floating over all that part of the country probably did more than any other influence to determine the sphere of his future literary activity. Between 1778 and 1783 he attended the high school of Edinburgh, where, despite occasional flashes of talent, he shone considerably more as a bold, high-spirited boy, with an odd turn for story-telling, than as a student. In 1783 he began attending the University of Edinburgh, where he continued about two years, it would seem, not greatly to his advantage. Afterwards, at the height of his fame, he was wont to speak with deep regret of his neglect of early opportunities. But, though leaving college scantily furnished with the knowledge formally taught there, he had been hiving up, in his own way, stores of valuable though unassorted information. From his earliest childhood onward he was an insatiable reader; and of what he either read or observed he seems to have forgotten almost nothing. He was a fairly good Latinist; of Greek he knew nothing, but he acquired a serviceable knowledge of French, Italian, Spanish, and German.

In music he showed no talent. In 1786 he was articled apprentice to his father; in 1788 he began to study for the bar, to which he was called in 1792. In his profession he had fair success, and in 1797 he married Charlotte Margaret Carpenter, the daughter of a French refugee, named Jean Charpentier. Toward the end of 1799, through the interest of his friends Lord Melville and the Duke of Buccleuch, he was made sheriff depute of Selkirkshire, an appointment which brought him £300 a year, with not very much to do for it. Meantime, in a tentative and intermittent way, his leisure had been occupied with literature, which more and more distinctly announced itself as the main business of his life. Excepting a disputation on being called to the bar, his first publication, a translation of Bürger's ballads *Lenore* and *The Wild Huntsman*, was issued in 1796. In 1799 appeared his translation of Goethe's drama of *Götz von Berlichingen;* and at this time he was writing for Monk Lewis the fine ballads, *Glenfinlas*, the *Eve of Saint John*, and the *Grey Brother*. In 1802 Scott published the first two volumes of his *Border Minstrelsy*, which were followed in 1803 by a third and final one. This work, the fruit of those 'raids'—as he called them—over the border counties, in which he had been wont to spend his vacations, won for him at once prominence among the literary men of the time. In 1804 he issued an edition of the old poem *Sir Tristram*, admirably edited and elucidated by valuable dissertations. Meantime, *The Lay of the Last Minstrel* had been in progress, and on its publication in 1805 Scott found himself the most popular poet of the day. During the next ten years, besides a mass of miscellaneous work, the most important items of which were elaborate editions of Dryden (1808) and of Swift (1814), including in each case a memoir, he gave to the world the poems *Marmion* (1808); *The Lady of the Lake* (1810); *The Vision of Don Roderick* (1811); *Rokeby* (1813); *The Bridal of Triermain* (1813); and *The Lord of the Isles* (1815). The enthusiasm with which the earlier of these works were received somewhat abated as the series proceeded. The charm of novelty was no longer felt, and the poetry had deteriorated. Moreover, in the bold outburst of Byron, with his deeper vein of sentiment and concentrated energy of passion, a formidable rival had appeared. All this Scott distinctly noted, and after what he felt as the comparative failure of *The Lord of the Isles* in 1815, he published, with the trivial exception of the anonymous *Harold the Dauntless* (1817), no more poetry. But already in *Waverley, or 'Tis Sixty Years Since*, which appeared without his name in 1814, he had achieved the first of a new series of triumphs. *Guy Mannering* (1815), *The Antiquary* (1816), *Old Mortality*, *The Black Dwarf* (1817, really 1816), *Rob Roy* (1818), and *The Heart of Midlothian* (1818) rapidly followed. The remainder of the famous group known as the Waverley novels form the most

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splendid series of historical portraits in any language. *The Bride of Lammermoor* (1819); *The Legend of Montrose* (1819); *Ivanhoe* (1820); *The Monastery* (1820); *Kenilworth* (1821); *Quentin Durward* (1823); *The Talisman* (1825) —these are among the most enduring of those great stories which enchanted Europe and had an immense influence on the development of fiction.

Scott was now at the height of his fame and prosperity. He was living at Abbotsford, the 'romance in stone' he had built for himself in the border country which he loved. There he entertained with princely hospitality admirers of many types. In 1820 he was created a baronet. But his fortunes, secure as they seemed, were built upon insecure foundations. In 1805 Scott's income, as calculated by his biographer, was about £1000 a year, irrespective of what literature might bring him, a competency shortly increased, on his appointment to a clerkship of the Court of Session, by £1300. But what was ample for all prosaic needs seemed poor to Scott's imagination. In 1805, lured by the hope of immense profits, he secretly joined James Ballantyne, an old schoolfellow, in a large printing business in Edinburgh. To this, a few years afterwards, a publishing business was added, under the nominal conduct of John Ballantyne, a brother of James; Scott, in the new adventure, becoming, as before, a partner. Gradually the affairs of the two firms became complicated with those of the great house of Constable & Co., in the sudden collapse of which in 1826 the Ballantynes were involved to the extent of £120,000. Compromise with their creditors would have been easy. But Scott regarded the debt as personal. "If I live and retain my health," said Scott, "no man shall lose a penny by me." And, somewhat declined as he now was from the first vigor and elasticity of his strength, he set himself to liquidate by his pen this large sum. The stream of novels now flowed swiftly. A *History of Napoleon*, in eight volumes, was undertaken and completed, with much other miscellaneous work; and within a space of two years Scott had realized for his creditors nearly £40,000. A new and annotated edition of the novels (begun in 1829) was issued with immense success; and there seemed every prospect that, within a reasonable period, Scott might again face the world, as he had pledged himself to do, owing no man a penny. In this severe labor he broke down. In 1830 he was smitten with paralysis, from which he never thoroughly rallied. It was hoped that the climate of Italy might benefit him. The Admiralty placed at his disposal a man-of-war on which he took a Mediterranean voyage, touching at Malta and Naples. But in Italy he pined for the home to which he returned only to die. At Abbotsford, on September 21, 1832, he passed away, with his children round him. On the 26th he was buried beside his wife (d. 1826) in the beautiful ruins of Dryburgh Abbey. By the sale of copyrights, all Scott's debts were liquidated in 1847.

In regard to Scott's poetry there is now little difference of opinion. Its genuine merits continue to secure for it some part of the popular favor with which it was at first received. Deficient though it be in certain of the higher and deeper qualities, and in finish, it is admirable in its frank *abandon*, in its boldness and breadth of effect, its succession of clear pictures, and its rapid and fiery movement. Scattered here and there are little snatches of ballad and song scarcely surpassed in our language. As a novelist Scott had some shortcomings. With the artistic instinct granted him in largest measure, he had little of the artistic conscience. Writing offhand, he would not watch his work as it proceeded. Hence he is an exceedingly irregular writer; many of his works are in structure most lax and careless, and some of the very greatest of them are marred by occasional infusions of obviously inferior matter. Yet it may be doubted whether in mass and stature Scott is quite reached by any other English novelist. Of Scott's novels, those dealing most intimately with Scotch life are the best. As a force, Scott's influence has been immense. He discovered the historical novel and from him proceed the countless tales of national life since written in Great Britain, throughout Europe, and in the United States. Scott, too, gave to fiction that encyclopædic character since exemplified in Balzac, Dickens, and Thackeray. He did more than all other men of his time to enlarge our vision, by extending it over wide stretches of history. He also revolutionized the current conceptions of history as a body of dry facts. His logical successor was Macaulay.

Scott's miscellaneous prose works, comprising essays on the novelists, etc., were collected in 1827, in 1834-36, and in 1841. His poems and novels exist in many editions. The following list includes such works as have not already been mentioned: *Apology for Tales of Terror* (12 copies privately printed, 1799); "Ballads," in Lewis's *Tales of Wonder* (1801); *Ballads and Lyrical Pieces*, from *Border Minstrelsy* and *Tales of Wonder* (1806); *Abstract of Eyrbiggia Saga*, in Jameson's *Northern Antiquities* (1814); *Chivalry* and *Drama*, in Supplement to *Encyclopædia Britannica* (1814); *Introduction to Border Antiquities* (1814-17); *The Field of Waterloo* (1815); *Paul's Letters to His Kinsfolk* (1815); *The Search After Happiness, or the Quest of Sultan Solimaun*, and Kemble's Address on the *Sale Room* (1817); *Description of the Regalia of Scotland* (1819); *The Visionary by Somnambulus*, a political satire, republished from the *Edinburgh Weekly Journal* (1819); *The Abbot* (1820); biographies in Ballantyne's *Novelists* (1821); *Account of George III.'s Coronation* (1821); *The Pirate* (1822); *Halidon Hill* (1822); *Macduff's Cross*, in Joanna Baillie's *Poetical Miscellanies* (1822); *The Fortunes of Nigel* (1822); *Peveril of the Peak* (1822-23); *Saint Ronan's Well* (1824); *Redgauntlet* (1824); *Tales of the Crusaders; The Betrothed* (1825); *Thoughts on the Proposed Change of Currency* (1826); *Woodstock, or the Cavalier: a Tale of 1651* (1827); *Chronicles of the Canongate; The Two Drovers; The Highland Widow; The Surgeon's Daughter* (1827); *Tales of a Grandfather* (4 series, 1828, 1829, 1830, 1830); *Chronicles of the Canongate*, second series; *Saint Valentine's Day, or the Fair Maid of Perth* (1828); "My Aunt Margaret's Mirror," "The Tapestried Chamber," and "The Laird's Jock," in the *Keepsake* for 1828; *Religious Discourses, by a Layman* (1828); *Anne of Geierstein* (1829); *History of Scotland*, in Lardner's *Cabinet Encyclopædia* (1830); "Letters on Demonology and Witchcraft," in Murray's *Family Library* (1830); *House of Aspen*, in the *Keepsake*

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(1830); *Doom of Devorgoil: Auchindrane, or the Ayrshire Tragedy* (1830); *Essays on Ballad Poetry* (1830); *Tales of My Landlord* (4th series); *Count Robert of Paris; Castle Dangerous* (1832).

For the facts of his life, consult: Lockhart's *Life* (London, 1838; often reprinted; best edition by Pollard, 1900); Scott's *Journal* (Edinburgh, 1890) and *Familiar Lessons* (ib., 1893); and R. H. Hutton, in "English Men of Letters" (New York, 1879). For Scott's influence on the Continent, consult Louis Maigron, *Le roman historique* (Paris, 1898); and Gotschall, *Die deutsche Nationallitteratur des 19ten Jahrhunderts*, vol. iv. (Breslau, 1881). For estimates, consult: Carlyle's "Essay," in *Critical and Miscellaneous Essays* (London, 1840); Bagehot, in *Literary Studies* (London, 1895); and Stevenson's "Gossip on Romance," in *Memories and Portraits* (London, 1891); also Crockett, *The Scott Country* (New York, 1902). See also NOVEL; ROMANTICISM; ENGLISH LITERATURE.

SCOTT, WILLIAM AMASA (1862—). An American economist, born in Clarkson, Monroe County, N. Y., and educated at the University of Rochester, with a post-graduate course in Johns Hopkins University (1890-92). He had taught political economy in the University of South Dakota from 1887 to 1890, and, on leaving Johns Hopkins, where he had acted as instructor in history, became assistant professor of economics in the University of Wisconsin, was titular professor from 1897 to 1900, and then director of the School of Commerce and professor of economic history and theory. His publications include *Repudiation of State Debts* (1893) and *Reports* of State Committees of Wisconsin.

SCOTT, WILLIAM BELL (1811-90). A Scotch poet and painter, born at Saint Leonard's, Edinburgh. He was a son of Robert Scott, the engraver, and a younger brother of David Scott (q.v.), the distinguished painter. He was educated at the Edinburgh High School, studied art at the Government academy and in the British Museum, and worked with his father at engraving. In 1837 he went to London and began his career as etcher and painter. In 1844 he was appointed master of the Government schools of design at Newcastle-on-Tyne, a post which he occupied with distinction till 1864. In the meantime he had executed a series of large pictures for Sir Walter Trevelyan at Wallington Hall, taking his subjects from border history and legend; and a few years later he also painted a series of designs from the *King's Quhair* for the stairway at Penkill Castle in Perthshire. His last years were passed at Chelsea, near his intimate friend D. G. Rossetti (q.v.), and at Penkill Castle with another friend, Miss Boyd. Among Scott's published designs is *William Blake: Etchings from His Works* (1878). On art or artists he wrote a *Memoir of David Scott* (1850); *Albert Dürer: His Life and Works* (1869); *The British School of Sculpture* (1872); *Our British Landscape Painters* (1872); *Murillo and the Spanish School* (1873); and works on the modern schools in France, Belgium, and Germany. His own illustrations added to the charm of these books. Scott began writing verse while living in Edinburgh. He was strongly under the influence of Blake and Shelley and later he came under the spell of Rossetti. His finest poems are contained in *Ballads, Studies from Nature, Sonnets*, etc. (1875), and in *A Poet's Harvest Home* (1882). A love for mysticism is most marked in *The Year of the World* (1846). After his death there appeared, under the editorship of W. Minto, *Autobiographical Notes* (London, 1892), interesting reminiscences of fifty years, particularly of Rossetti and the Pre-Raphaelites (q.v.).

SCOTT, WILLIAM BERRYMANN (1858—). An American geologist, born in Cincinnati, and educated at Princeton (class of 1877) and at the University of Heidelberg. Upon his return to America he was appointed professor of geology and paleontology at Princeton. The Princeton geological expeditions in the West and in Patagonia were under his lead and he made valuable additions to the geological and ornithological collections of the university. Besides many valuable monographs, he wrote *An Introduction to Geology* (1897).

SCOTT, WINFIELD (1786-1866). A distinguished American soldier. He was born near Petersburg, Va., of Scottish ancestry, June 13, 1786; attended William and Mary College for a time; and was admitted to the bar in 1806. In 1808, however, he abandoned the legal profession and accepted an appointment as captain of light artillery. While stationed at Natchez, in 1810, he was court-martialed for accusing his superior officer, General Wilkinson, of complicity in the conspiracy of Aaron Burr, and was temporarily suspended from the army. Upon the outbreak of the War of 1812, he was appointed lieutenant-colonel and sent to the Canadian frontier. He crossed with his regiment to Queenstown, where the American troops were at first successful, but the British troops being reinforced, the Americans were repulsed with heavy loss and Scott was taken prisoner. In the following year he was exchanged and was then appointed adjutant-general with the rank of colonel. During the same year he was wounded by an explosion of a powder magazine after the attack on Fort George. In 1814 he was promoted to the rank of brigadier-general. On July 5th he fought and won the battle of Chippewa, and on the 25th fought in the battle of Lundy's Lane (q.v.), in which he was twice wounded, the last time severely. He declined the appointment of Secretary of War at the close of hostilities, and was raised by Congress to the rank of major-general. He then prepared a set of extensive general regulations for the army, which was the first complete manual of military tactics prepared in the United States.

In 1841 he was appointed commander of the United States Army to succeed General Macomb. In 1847 he was given the chief command of the United States Army in Mexico, and on March 9th landed a force of 12,000 men at Vera Cruz, at once investing and bombarding the city, which surrendered on the 26th. On April 18th he carried the heights of Cerro Gordo, and on May 15th entered Puebla, where he waited for reinforcements. On August 19-20th he won the brilliant victories of Contreras and Churubusco. These were soon followed by the sharp and sanguinary battles of Molino del Rey and Chapultepec on the 8th and 13th of September respectively. On September 14th, with less than 8000 soldiers, he entered the City of Mexico and occupied the

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national palace. (See MEXICAN WAR.) General Scott returned from the war with great fame as a soldier, and in 1852 was nominated as the Whig candidate for the Presidency, but carried only four States. In 1855 the office of lieutenant-general was revived by Congress in order that it might be conferred by brevet on General Scott. Increasing age and infirmity prevented him from taking active command of the army during the Civil War, and in October, 1861, he retired from active service. Subsequently he visited Europe and afterwards settled at West Point, where he died May 29, 1866. His autobiography was published in two volumes at New York in 1864.

Consult the biography by Mansfield (New York, 1852), and that by Headley and Victor (ib., 1861). The latest and best is that by Wright (ib., 1894) in the "Great Commanders Series."

SCOTTDALE. A borough in Westmoreland County, Pa., 35 miles southeast of Pittsburg, on branches of the Pennsylvania and the Baltimore and Ohio railroads (Map: Pennsylvania, B 3). It has large coal-mining and coke interests, and iron-working establishments. It manufactures also flour and lumber products. Population, in 1890, 2693; in 1900, 4261.

SCOTTISH ACADEMY, ROYAL. An institution devoted to painting, sculpture, and the encouragement of the fine arts, formed at Edinburgh, Scotland, in 1826, and incorporated by royal charter in 1838. It was modeled after the Royal Academy of London, and in the early years of its existence occupied a range of galleries in the building of the Royal Institution, in which its annual exhibitions were then held. In 1854 the National Gallery, a building to be devoted to the fine arts, was completed and provision was made for the exhibitions of painting and sculpture of the Royal Scottish Academy, which are annually held there. Accommodation is also afforded in the building for the schools of the Academy.

SCOTTISH GAELIC LITERATURE. Throughout the Old Irish period and most of the Middle Irish, the Gaelic countries may be said to have had a common literary tradition. Intercourse was easy between the two halves of the Gaelic world and the bards passed freely back and forth. The scenes of ancient sagas like the *Longes Mac n-Usnig* were laid on both sides of the Irish Sea, and the hero-tales of Cuchulainn and of the Fenians were current in the Scottish Highlands. Unfortunately, the early monuments of Scottish Gaelic are very scanty. The *Book of Deir*, a Latin Gospel-book of the ninth century, contains a Gaelic passage which corresponds strictly to Old Irish; and certain later entries in the same manuscript show that the language of the eleventh and twelfth centuries still stood very near to the Irish of Ireland. A considerable number of Middle Irish manuscripts are preserved in the libraries of Scotland.

Not until the sixteenth century—the time, roughly speaking, of the Protestant Reformation—did the language and literature of Scotland have an independent development. The beginning is marked by *The Book of the Dean of Lismore*, a manuscript collection of poems made in 1512 and containing much valuable Ossianic material. Even in the Dean's Book some poems are rather Irish than Scottish. The first printed work was Bishop Carsewell's translation of John Knox's liturgy (1567), and a great part of the Highland literature ever since, like that of modern Wales, has been theological in character. There have not been lacking secular poets, however, the successors of the ancient Irish bards whose name they still preserved. In the seventeenth century the most famous were Mary MacLeod and John Macdonald; in the eighteenth Alexander Macdonald, Robert Mackay (Rob Donn), Dugald Buchanan, Duncan Ban McIntyre, and William Ross; and in the early nineteenth Allan MacDougall and Ewen MacLauchlan were of special note.

The portion of Gaelic literature that has been most widely known and discussed—and at the same time most generally misunderstood—is the Ossianic poetry. (See MACPHERSON, JAMES.) The works of Macpherson and his followers are utterly unlike the real Ossianic literature of both Scotland and Ireland. But these writers rendered a real service to the Gaelic literature which they represented. They made it known to the literary world abroad, and they gave the impulse to the collection of popular poetry at home. During the last hundred years or more a large mass of both ballads and folk-tales has been printed, and the work of collection is still going on. Among those who have labored thus to preserve the national literature the first place belongs undoubtedly to J. F. Campbell of Islay.

BIBLIOGRAPHY. For the *Book of Deir*, see Dr. Stuart's edition (Edinburgh, 1862). Compare further Whitley Stokes, *Goidelica* (London, 1872), and J. Strachan in the *Proceedings of the Gaelic Society of Inverness* (vol. xix.). *The Book of the Dean of Lismore* was edited by Thomas McLachlan (Edinburgh, 1862) and again more correctly by Alexander Cameron, *Reliquiæ Celticæ* (ib., 1892). The best poems of the modern bards have been printed in the anthology of John Mackenzie, *Sar-Obair nam Bard Gaelach* (Glasgow, 1865). On the Ossianic controversy see the admirable articles of L. Christian Stern in the *Zeitschrift für Vergleichende Litteraturgeschichte* (vol. viii.). Campbell's great collections are entitled *The Popular Tales of the West Highlands* (1860-62) and the *Leabhar na Feinne* (1872). The series entitled *Waifs and Strays of Celtic Tradition* contains many of the most valuable contributions of later collectors. Alexander Carmichael's *Carmina Gadelica* (1900) is the most important work in this field since Campbell. Much of the best Gaelic prose and verse of the nineteenth century was contributed to such periodicals as *An Gaodhal*, the *Cuairtear nan Gleann*, and the *Teachdaire Gaodhalach*. The Gaelic works of Norman Macleod have been collected under the title *Caraid nan Gaidheal* (new ed., Edinburgh, 1899-1901). On the literary history two general treatises may be cited: Blackie, *The Language and Literature of the Scottish Highlands* (Edinburgh, 1870), and MacNeill, *The Literature of the Highlanders*. See SCOTTISH LANGUAGE AND LITERATURE; CELTIC LANGUAGES; IRISH (GAELIC) LITERATURE.

SCOTTISH LANGUAGE AND LITERATURE. By the Scottish language is meant the English dialect once cultivated in Scotland and now spoken in remote districts. When, in the

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fourteenth century, English becomes again a cultivated language after the linguistic disturbances following the Norman Conquest, it falls into three clearly marked dialects: The southern (south of the Thames), the midland (the central counties of England), and the northern, spoken and written from the Humber to the north as far as the Teutons had settled in Scotland. For England the midland dialect, the language of the Court, soon became the standard. But Scotland in the meantime had won her independence at Bannockburn (1314), and had established her own government, which she maintained till the union of the crowns by the accession of James to the English throne (1603). More precisely, then, the Scottish language is the cultivated language of Scotland from about 1310 to 1603. From the standard English of England it differed originally in sounds, in spelling, and in syntax. And these differences subsequently increased, owing to the hostility between the two countries. The Scottish dialect also came under the influence of the Gaelic and the Kymric, from which many words were taken. It was in the north, too, that the Norsemen, settling in the ninth and tenth centuries, influenced in vocabulary and perhaps in syntax the speech of the people by whom they were absorbed. Moreover, Scotland was for a long period in close alliance with France. Scotchmen went to France rather than to England to complete their education, and they entered the French service in large numbers. As a result there was introduced into the Scotch dialect a body of French words not found in the literature south of the Tweed. To the vernacular of Scotland as a cultivated language the Reformation proved a death blow; for it put an end to the friendship with Catholic France, and eventually brought to the cottage of the Scotch peasant the Bible written in the standard English of the south.

Except for some fragments of minstrelsy and the romances which in origin may go back to the mysterious Thomas the Rhymer, Scottish vernacular literature begins with John Barbour, Archdeacon of Aberdeen, whose *Bruce* (1375) appeared while Chaucer, then in his prime, was showing the artistic possibilities of the new English as spoken in London. Barbour's poem, narrating the exploits of Robert Bruce from his wanderings as an outlaw in the mountains to his victory at Bannockburn and then on to Irish and other wars, gave stirring expression to the Scotch feeling of independent nationality. Andrew Wyntoun, prior of Saint Serf's Inch, in Loch Leven, followed Barbour with a metrical history called the *Orygynalle Chronykil of Scotland* (about 1424). Though less exultant in its patriotism than the *Bruce*, this poem is nevertheless very significant as a plain narrative of events in Scotland founded on the best traditions and authorities at the command of the author. Literature had thus discovered the hero and the history of Scotland. Patriotic themes were continued by others, especially by Henry the Minstrel or Blind Harry (toward the close of the fifteenth century), who matched Barbour's poem with *William Wallace*, pervaded with the spirit of freedom. Oddly enough, Scotch verse had already come under the influence of Chaucer. Patriotism proved weaker than the sense for form and beauty. The first and best of the Chaucerians was James the First, who ruled Scotland from 1420 to 1437. For nineteen years he had been held in captivity by the English, and while in the Tower of London he is said to have composed *The Kingis Quair* (i.e. *The King's Book*), an allegorical poem in the manner of the romance poems of Chaucer. In previous Scotch poetry the octosyllabic rhyming couplet had usually been employed. James adopted the seven-line stanza of Chaucer. His language, too, with its infusion of English words, was not strictly Scotch. Chaucer's influence in the north reached its height in *The Testament of Cresseid* by Robert Henryson of Dunfermline (d. about 1506), long attributed to Chaucer himself. It is a continuation of *Troilus and Cressida*. Henryson was also the author of *Robene and Makyne*, the earliest pastoral in any English dialect, and of several delightful fables in verse. The greatest name of this period is William Dunbar (d. about 1513), who was connected with the Court of James IV. He was likewise affiliated with the school of Chaucer by *The Goldyn Targe* and *The Thrissill and the Rois*. His masterpiece is the grim *Dance of the Sevin Deidly Synnes*. Gavin Duglas, who also handled allegorical themes in *The Palice of Honour*, translated Vergil's *Æneid*, to the various books of which he prefixed remarkable verse descriptions of the months and seasons. A poet more widely read was Sir David Lindsay (d. 1555), who possessed rare power of observation and a vigorous style. His richly imaginative *Dreme* was followed by several trenchant satires on abuses in Church and State, such as *The Testament and Complaynt of our Soverane Lordis Papyngo*, and an interlude entitled *Ane Pleasant Satyre of the Thrie Estaitis*, interesting as a link in the history of the English drama and as a vivid picture of contemporary manners. Lindsay was the last of the great poets distinctly Scottish. After him Scotch verse lost itself in the bitter theological debates of the Reformation. In the period we have covered there had appeared many poets of less fame and a large body of anonymous verse. Particular attention should be called to the popular ballads, which, like the Scotch *Chevy Chace*, far surpass in imaginative detail similar work in England.

If the Reformation, as has been said, proved uncongenial to Scotch verse, it gave an impetus to Scotch prose. Much of this prose, however, hardly rises to the plane of literature. The earliest prose work of interest was John Bellenden's translation (completed 1533) of Hector Boece's *Historia Scotorum*. Of greater importance was *The Complaynt of Scotlande* (printed 1549), whose authorship is still uncertain. It is a curious and brilliant satire on Scotland. Scotch prose attained its most effective power in *The History of the Reformation* (completed 1564) and the various tractates of John Knox. Other prose writers of the period were Robert Lindsay of Pitscottie (d. 1565?), author of a continuation of Boece's chronicle history; George Buchanan, who wrote both in Latin and in the vernacular; and Bishop John Leslie (d. 1596), the leading Roman Catholic historian of Scotland. Scotch prose may be said to end with James VI., author of *Demonologie* (1587) and other treatises. After ascending the English throne as James I. in 1603 he adopted in his books the language of the south.

The Scotch poets of the time, like Sir William Alexander and William Drummond of Hawthorn-

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den, commonly followed the example of King James. But there were some exceptions. Several balladists among the aristocracy, as Robert Sempill (d. about 1665) and Lady Wardlaw (d. 1727), continued the traditions of the early poets. The language of the peasantry still remained Scotch, and several writers of the eighteenth century attempted to restore the native speech to literature. Allan Ramsay (d. 1758) gained immense popularity by his songs composed in a mixture of Scotch and standard English. After Ramsay came a group of imitators, and then the fine vernacular verse of Robert Fergusson (d. 1774), who is rightly regarded as the forerunner of Robert Burns. A peasant by birth and thus at home in the vernacular, Burns added to his knowledge by reading Fergusson, Ramsay, and the poets of the old period. In Burns the humor and pathos of native Scotch song reached its highest point. The tradition of Scotch song was kept up with varied success by John Mayne (d. 1836), Hector MacNeill (d. 1818), Joanna Baillie (d. 1851), Lady Nairne (d. 1845), James Hogg (d. 1835), Robert Tannahill (d. 1810), and Allan Cunningham (d. 1842). Others still continue to write occasional good songs. But Scotch verse since Burns has run into a sort of Scotch-English, which announces its end. It should be observed that the revival of the Scotch dialect has had an important influence on the novel. Sir Walter Scott's characters taken from the peasantry speak this native speech. And more recently Barrie and Watson have written admirable stories in the dialect of remote parishes.

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SCOTUS, DUNS. A mediæval schoolman. See DUNS SCOTUS.

SCOTUS, JOHANNES. A philosopher of the ninth century. See ERIGENA.

SCOURGE OF GOD, THE. A name given to Attila, King of the Huns, who was the terror of Europe in the fifth century.

SCRAG WHALE (so called because the back is scragged instead of finned). The name of two different whales. That in the North Atlantic is a rorqual (*Agelaphus gibbosus*), which reaches about 50 feet in length, has no dorsal fin, and has whitish baleen. The scrag of New Zealand waters is the 'pigmy right whale' (*Neobalæna marginata*), which does not exceed about 15 feet in length, but yields the most elastic and toughest whalebone sent to market.

SCRANTON. The fourth city in population of Pennsylvania and the county-seat of Lackawanna County; situated on the Lackawanna River, 160 miles by rail north of Philadelphia and 145 miles northwest of New York (Map: Pennsylvania, F 2). Five railroads enter the city: the Delaware, Lackawanna and Western, main line and Bloomsberg division; the Delaware and Hudson, main line; the New York, Ontario and Western; the Erie (Wyoming division); and the Central Railroad of New Jersey. There is one electric line—the Wyoming Valley Rapid Transit Company. The street railway system comprises 40 miles of well-constructed road. Scranton has a picturesque location in the Lackawanna Valley, on the plateau at the confluence of Roaring Brook and the river. The city, which has an area of 19½ square miles, is situated at elevations ranging from 800 feet to nearly 1800 feet above the sea. There are 149 miles of streets and avenues in addition to traveled courts and places.

Among the notable public edifices are the United States Government Building, Court-House, City Hall, Albright Memorial Library, Moses Taylor Hospital, the Oral School for the Deaf and Dumb, and the High School. Other prominent structures are the International Correspondence School, the Y. M. C. A., the Home of the Friendless, the Board of Trade, the Jermyn Hotel, the Masonic Temple, and the spacious Connell Building. The city has two free and several other libraries. The largest is the Albright Memorial, having 45,000 volumes, with an annual circulation of 125,000 volumes. There are 40 school buildings, surpassed by none in the State in architecture and modern improvements, besides several colleges and academies, an Historical Society, and a Society of Natural Science. The two public parks contain 100 acres. The valuation of real property (1903) is $54,157,813.

Scranton is the centre of the great anthracite coal region, and is one of the principal distributing points for coal. It is also an important centre for general trade, having a number of wholesale blocks. There is invested in incorporated manufacturing establishments $25,000,000. The leading plants include a nut and bolt manufactory, a lace curtain mill, a knitting mill, iron foundries, locomotive and stationary engine works, and several silk mills. The government is vested in a mayor, elected every three years; select and common councils; and administrative departments as follows: public safety, public works, assessors, city treasurer, city comptroller, city attorney, city clerk, and sinking fund commission. The city spends annually, in maintenance and operation, nearly $500,000. The public schools are under the direction of a board of control, on which each ward has a representative. The total expenditures for school purposes, including repairs, salaries, and erection of buildings, for 1902, were $430,489.

In 1788 Philip Abbott of Connecticut, his brother James, and others formed the first settlement, now included in the city, on the 'Roaring Brook.' In 1799 came the Slocums, who named their settlement 'Slocum Hollow.' The city was founded, however, by Joseph H. and George W. Scranton in 1840. It was incorporated as a borough in 1854, and was chartered as a third-class city in 1866, becoming a second-class city in 1901. The population, in 1860, was 20,000; in 1870, 35,092; in 1880, 43,850; in 1890, 75,275; in 1900, 102,026.

SCRANTON, GEORGE WHITEFIELD (1811-61). An American manufacturer, born in Madison, Conn. In 1839, with his brother, Joseph H. Scranton, he established an iron manufactory on the site of the present city of Scranton, which is named for them. He was one of the organizers of

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the Delaware, Lackawanna and Western Railway, and served for many years as its president, being also president of other railroads and transportation companies.

SCREAMER. Any of three curious South American birds, the relationship of which has been a matter of considerable discussion. They are now regarded as most nearly related to the anseriform birds and forming a family (Palamedeidæ). The bill is rather short, conical, curved at the extremity; there is a bare space around the eyes; the toes are long; each wing is furnished with two strong spurs, one at the bend of the wing and a smaller one nearer the tip. The horned screamer, or 'anhima,' 'chaha,' or 'kamichi' (*Palamedea cornuta*), inhabits swamps in Brazil, Guiana, and Argentina, and feeds on the leaves and seeds of aquatic plants. It is of a blackish-brown color, is nearly as large as a turkey, and has somewhat the appearance of

CRESTED SCREAMER (*Chauna cristata*).

a gallinaceous bird. It receives its name from its loud and harsh cry. From the head, a little behind the bill, there rises a long, slender, movable horn, the use of which is not clear. The spurs of the wings are supposed to be useful in defense against snakes and other enemies.

Closely allied to this is the genus Chauna, to which belongs the chauna, or crested screamer (*Chauna cristata*), a native of Brazil, Paraguay, and Argentina, the head of which has no horn, but is adorned with erectile feathers. The plumage is mostly lead-colored and blackish. The wings are armed with spurs. It is capable of domestication, and is sometimes reared with flocks of geese and turkeys, to defend them from vultures, being a bold and powerful bird. Consult: Evans, *Birds* (London, 1900); Sclater and Hudson, *Argentine Ornithology* (London, 1888).

SCREECH OWL. See Owl.

SCREEN (OF. *escren, escrein, escran*, Fr. *écran*, screen, probably from OHG. *scranna*, Ger. *Schranne*, bench, shambles, railing, grate, court). In architecture, an inclosure or partition of wood, stone, or metal work. It is of frequent use in churches, where it shuts off chapels from the nave, separates the nave from the choir, and frequently incloses the choir all round. The rood-screen is that on which most labor is usually bestowed. In England many beautifully carved screens in stone, enriched with pinnacles, niches, statues, etc., remain, such as those of York, Lincoln, and Durham; and specimens in wood, carved and painted, are common in parish churches. The term 'screen of columns' is also applied to an open detached colonnade.

SCREW (OF. *escroue, escroe, escro*, Fr. *écrou*, screw, perhaps from Lat. *scrobs*, ditch, trench, or more probably from Lat. *scrofa*, sow). An inclined plane wrapped around a cylinder in such a manner that the height of the plane is parallel to the axis of the cylinder. If the screw is formed upon the inner surface of a hollow cylinder it is usually called a nut. Defined less technically a screw is a solid cylinder having a helicoidal rib, ridge, or thread projecting from its surface. Historically the invention of the screw is ascribed to Archimedes (B.C. 250). It was used by the Romans of the Empire in their wine and oil presses and was probably familiar to most of the Mediterranean peoples at the beginning of the Christian Era.

It is one of the most extensively used of the elementary mechanisms and is employed in the manufacture and operation of nearly all structures, machines, and mechanisms. The force for operating the screw is universally applied at the end of a lever arm at right angles to the axis of the screw. When used for transmitting energy the screw is generally operated in connection with a nut; either the screw or the nut may be fixed, the other being movable.

Until the nineteenth century the manufacture of screws was a rather crude process of forging and cutting with hand tools. At present large screws for transmitting energy are made on screw-cutting lathes, the cylinder of metal being rotated by the lathe in front of a tool, which advances at a uniform speed parallel to the axis of the work and thus cuts a helicoidal groove. Generally such screws are made with rectangular threads. The most common forms of screws are wood screws for cabinet and carpenter work and machine screws for metal work. Machine screws are made with care to secure precision in the forms and dimensions of the thread, but wood screws are more roughly made. These small screws were little known or used before 1836, being rudely made by hand with imperfect tools. The head was forged or swaged by a blacksmith; the thread and nick were formed by the use of hand dies and hack saws. In 1836, as a result of an American invention, the old hand tools were transformed into machines having the capacity of imparting to each tool its proper motion. The swaging hammer became the heading machine, receiving the end of a coil of wire and regularly cutting the required length for a blank, which then received such a blow as to 'set up' one end of the wire to form the head—the operation continuing automatically until the whole coil was made into blanks. These blanks were then handled individually and presented to organized machines, first for shaving the head, then for nicking, and lastly for cutting the thread. The above constitutes the second era in this manufacture; and such machinery, partly automatic, was all that was in use before 1846. Then a third era ensued, and an entire revolution was effected by constituting the machines entirely automatic. The blanks are by this system supplied in mass by the operator, the machine

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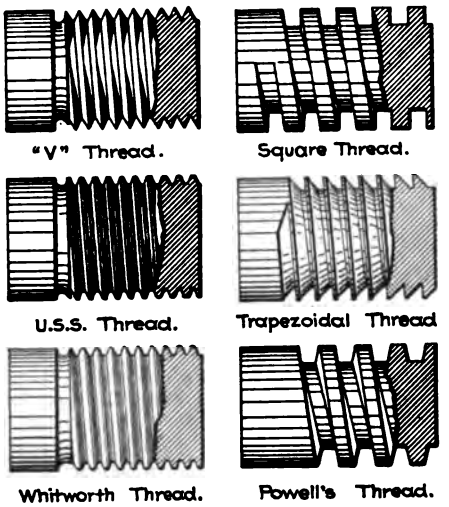
separating and handling each blank respectively as the nature of the operation demands, and producing finished screws with wonderful rapidity, regularity, and perfection.



STANDARD SCREW THREADS.

Formerly all wood screws were cut screws, that is, the metal of the body of the blank was cut away in grooves, leaving the thread projecting. In recent years, however, a process of rolling and press working has been employed by which the threads are raised without loss of the metal between them. In nearly all cases the threads of wood screws and machine screws are triangular in shape. The extensive use of screws has led to standard shapes and dimensions being adopted for screw threads. In England this standard is the Whitworth thread, designed by Sir Joseph Whitworth; in the United States it is the United States standard or Sellers thread, devised by William Sellers of Philadelphia. These standards relate particularly to the threads of machine screws, bolts, and nuts, etc. For tables of dimensions of screw threads and various other data regarding the use and efficiency of screws, see Kent's *Mechanical Engineers' Pocket-Book* (New York, 1900); also Rowland, on "Screws," in the *Encyclopædia Britannica*.

SCREW DOCK. See CAISSON.

SCREW-PINE (*Pandanus*). A genus of plants of the natural order Pandanaceæ, natives of tropical Asia and of the South Sea Islands. Many of them are remarkable for their prop roots. Their spiny-edged, sword-shaped leaves, 3 to 4 feet long, are spirally arranged in three rows. In general appearance, when unbranched they resemble gigantic pineapple plants, whence their popular name. *Pandanus odoratissimus* is a widely distributed spreading and branching tree, 25 feet high, much used in India for hedges. It grows readily in a poor soil and is one of the first plants to appear on newly formed islands in the Pacific. The unexpanded flowers are frequently boiled with meat. Oil impregnated with the odor of the flowers and the distilled water of them are highly esteemed East Indian perfumes. The terminal buds, the soft, white bases of the leaves, and the fleshy part of the drupes, which grow together in large heads, are eaten in time of scarcity. The spongy and juicy branches are used as cattle food. The leaves are used in thatching, and in making a kind of umbrella common in India, and their tough longi-

SCREW-PINE (*Pandanus utilis*).

tudinal fibres for making hats and cordage. Their spindle-shaped fibrous roots are split for basket-making. More valuable as a fibre plant is an allied species, *Pandanus utilis*, the vacoa of Mauritius, which grows to a height of about 30 feet, but from continual cropping of its leaves usually grows to 6 or 10 feet. The fibres of its leaves are used for making bags, which rival in cheapness and usefulness the gunny bags of India. In temperate and northern climates these plants are commonly cultivated in greenhouses for ornament.

SCREW PROPELLER. A contrivance for propelling vessels which acts in the water like a screw bolt in a nut. It consists of a hub of cylindrical or spherical shape to which are attached the blades that form the screw. Screw propellers are cast in one piece or built up, the blades being attached to the hub with bolts. The latter plan is now common, though small screws are usually cast in one piece. Propellers are made of cast iron, cast steel, or bronze. The best are made of bronze of fine quality, because, though not equal to steel in strength, it corrodes very slowly—a very important point, as the corrosion not only diminishes the strength, but makes the blades rough and ragged at the edges, thereby reducing their efficiency.

The blades of a screw propeller may be considered as parts of separate threads winding around the hub and shaft, cut off by planes perpendicular to the shaft and at a distance apart about equal to the length of the hub. A simple true screw would be made of such form, but experiment has shown that some variations from the simple form are desirable. In the first place, the edges of the blades must be sharp and the thickness near the hub sufficient to stand the strain of propulsion. The outer ends are pointed or have the corners cut off to reduce the vibration, and in many screws the driving or leading edge is thrown to the rear from the normal radial line for the same reason. The number of blades varies from two to four. Two-bladed screws are at least as economical in smooth water as screws with more blades, but in

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rough water the vibration may become excessive. Four-bladed screws of large diameter are generally used in the merchant service for slow-moving engines. For fast vessels, merchant or naval, three-bladed screws are the rule.

The *pitch* of a propeller is its linear advance in one revolution, supposing the water to be immovable and the screw to turn in it as a bolt turns in a nut. If we imagine the thread to extend sufficiently along the shaft to make one complete revolution, the pitch is equal to the length of shaft required for this. In the true screw the pitch is constant at all points, but in propellers there are usually some variations in this respect, particularly near the hub in those which are cast and have small hubs. Many propellers are designed to have slightly varying pitch at different parts of the blade, but the advantages of this have never been conclusively determined. The hub, or boss, is now very commonly spherical with a conical tailpiece. Since the part of the blade near a relatively small hub is of little use, hubs are now made quite large, one-fifth to one-fourth the diameter of the screw. The diameter of the screw depends upon many things and no absolute rule can be laid down, though approximate rules are given in some text books. It is now general practice to record experimental data and design the screws in accordance with the results of actual practice, with such variations as the particular characteristics of the ship and machinery seem to require.

As it works in a yielding fluid, the propeller in ships of ordinary form has a greater speed than would be required if it turned in a solid nut. The difference in the distance traversed in the two cases is called the 'apparent slip.' In all cases, however, the propeller acts upon water already in motion, so that the *real slip*, which represents the backward velocity of the water acted upon by the screw, may differ considerably from the *apparent slip*. The speed of this following water is difficult to ascertain, so that the slip ordinarily referred to is the apparent slip. If v represents the speed of the vessel, s the speed of the screw, and w the forward speed of the water, then

$$\text{real slip} = \frac{s-(v-w)}{s} = \frac{s+w-v}{s}$$

Since a ship can only move by driving water astern, it is plain that *negative real slip* is impossible; but from the formula given it is evident that if w is large, real slip might exist even if v exceeded s. In rare cases, with vessels of exceptional form, negative slip has been observed; it always indicates a wasteful expenditure of power, for the force which gives forward motion to the water is derived from the ship in some way (bad shape of hull, frictional resistance, etc.). It must be noted that real slip—and therefore usually apparent slip—is a necessity of screw propulsion and does not of itself indicate loss of power. It is a necessary sequence of the action of a screw in a yielding fluid. The slip may be too great or too small, however; in the former case the pitch is probably (i.e. supposing no other cause operative) too great; if it is too small the pitch is probably too little. The efficiency of different forms of propellers differs but little provided their pitch, blade area, etc., are suitable to the conditions of their use; but several changes have to be made in some instances before these details are correctly determined. The most important point to be considered in propulsive efficiency is the shape of the vessel's hull. The shape of the bow (i.e. the entrance) is not so important, however, as that of the stern (i.e. the *run*); the former may be quite full and bluff without greatly reducing the speed except at very high velocities, but the latter must be very hollow or lean or the water will not flow in solid to the propeller or propellers except at low speeds.

The screw is secured to the end of an iron or steel shaft called the propeller-shaft or tail-shaft, which connects to the line shafting, which in turn joins the crank-shaft at the engines. The push or thrust of the screw is received on the thrust bearing, which has a series of raised lugs or collars and grooves fitting over or into similar ones in the shaft. Slow vessels and small vessels usually have a single screw. Large, fast ships are now generally fitted with twin screws, and a few are fitted with three. Some vessels having turbine engines have as many as nine screws, three on each shaft, and a Russian circular armored ship has six screws, each on a separate shaft. The advantages of multiple screws are that the very large power needed in modern fast vessels may be divided instead of being supplied by one ponderous engine, and the difficulties and dangers of breakdowns much reduced.

One of the first definite proposals—if not the first—of using the screw for propulsion came from the great French mathematician Bernoulli, who, in 1752, received a prize from the French Academy of Sciences for an essay on the manner of propelling boats without wind, in which he proposed the use of a screw. During the Revolution David Bushnell, an ingenious and patriotic American, made a practical submarine boat propelled by a screw turned by hand power and actually used the boat in an attempt to blow up a British man-of-war. See TORPEDO BOAT, SUBMARINE.

Two Americans, Oliver Evans and John Fitch, experimented with screw propellers between 1780 and 1790. In 1801 or 1802 another American, John Stevens, built a screw-propelled steamboat which he successfully used. But it remained for Ericsson to develop the screw. His first successes were achieved in England in 1837-38, but, getting little encouragement there, he came to the United States in 1839, where his plans were eagerly taken up by Commodore Stockton and other officers of the navy. Through their efforts the United States steamship *Princeton*, of 1000 tons, was built under Ericsson's superintendence. She was the first screw man-of-war built in any country and the first to have her machinery wholly below the water line. Her almost unqualified success settled the question of the availability of the screw for propulsion, particularly for war vessels. The use of paddle wheels in the merchant service continued for many years, but by 1870 the screw had everywhere triumphed except in the navigation of shoal or interior waters. For further information, consult: Barnaby, *Marine Propellers* (London and New York, 1891); *Transactions of the Institution of Naval Architects* (London, annual; different numbers contain many important papers on screw propulsion); *Navy Professional Papers* (United States Navy Department), "Screw Propulsion"; *Information from Abroad* (an annual; different

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numbers contain papers on screw propulsion and its development), issued by the office of Naval Intelligence, United States Navy; Bennett, *The Monitor and the Navy Under Steam* (Boston, 1900); Seaton, *Manual of Marine Engineering* (London and New York, 1896); Sennitt and Oram, *Marine Steam Engine* (ib., 1898). See also the articles on SHIPBUILDING and on STEAM NAVIGATION.

SCREW-WORM. The larva of a dipterous insect (*Compsomyia macellaria*), parasitic upon mammals and occasionally attacking human beings. The adult fly belongs to the family Sarcophagidæ and is less than a half an inch in length, bluish green with metallic reflections and three black stripes upon the thorax. It appears in the summer time and lays a mass of eggs either upon some decaying matter or in an open wound on some animal. Many cases are on record where eggs have been deposited in the nostrils of catarrhal persons sleeping in the open air. The eggs hatch in a very short time, even in a single hour. The larva or maggot is a whitish footless grub, rather slender and quite active, and burrows into the tissues of the affected animal or decaying matter that furnishes it food. It grows rapidly and matures in the course of a week or less, then leaves the wound and enters the ground to transform to pupa. The puparia are brown in color, cylindrical, rounded at the end, and about two-fifths of an inch long. The pupal stage lasts from 9 to 12 days, and there may be many generations in the course of a summer. The screw-worm fly inhabits all of tropical and much of temperate America, extending from Canada to Patagonia. As a direct application for the sores infested with worms a carbolic wash is advised, 1 part of carbolic acid to 30 parts of water. A little glycerin may be added, and a final dressing with pine tar is recommended. Where the nasal passages of human beings are inhabited by the maggots they should promptly be syringed out with a mixture of 1 part of carbolic acid to 200 parts of water. Several fatal cases have been reported. See MYIASIS. Consult Osborn, *Bulletin No. 5 (new series), Division of Entomology, United States Department of Agriculture* (Washington, 1896).

SCRIBE (Lat. *scriba*, from *scribere*, to write, scratch; connected with *scrobs*, ditch). A name given to one of a class of men in the Jewish Church who were learned in the law. The Hebrew word (*sōphĕr*) is related to the word meaning 'book' (*sēpher*), and hence occurs originally for a 'secretary,' as of Baruch (Jer. xxxvi. 26), or of a writer in general (Ps. xlv. 1); it is also used of a certain governmental official, perhaps a muster-officer (e.g. II. Sam. viii. 17). But upon the canonization of the Jewish Scriptures, which were 'the Books' *par excellence*, the name became confined to those who expounded these sacred volumes. In this confined sense the word first appears applied to Ezra, 'the priest, the scribe' (Ezra vii. 11); this application is significant because Ezra (q.v.) was the leading actor in the process of that canonization. In him the priest and the theologian are combined, naturally enough, for his work dealt with the priestly law. But it was the purpose of this canonization, which took place by a popular ratification (Neh. viii.), to make the law the code for the whole life of the nation, so that it soon became an object of even greater interest to the laity. Hence after the first steps in this process these scribes came to be drafted more and more from the people, and toward the end of the Jewish Commonwealth only a minority were of the priestly or Sadducee interest, the great number belonging to the Pharisees. (See PHARISEES; SADDUCEES.) The New Testament gives the earliest full data for this learned caste. The Greek word (γραμματεύς, 'man of letters') is a translation of the Hebrew. Other terms used are more exact in definition of the office; they are called 'lawyers' and 'teachers of the law.' Josephus well describes them as 'interpreters of the ancestral laws.' The New Testament carefully avoids confusing them with the Pharisees (e.g. Matt. xxiii. 2), for while the great majority of them belonged to this party, the scribes were the learned leaders of the party, those who had approved themselves by education and public acknowledgment as fit teachers. They were the theologians, and inasmuch as Jewish theology was eminently practical, they were the jurists who interpreted the law for the courts, and the casuists who settled individual questions. Their functions have been defined as (1) the theoretical development of the law; (2) the teaching of the law; (3) the giving of legal opinion in court. They enjoyed the unbounded reverence and obedience of the people (even the Sadducees could not withstand their power) and established what is, perhaps, the most remarkable system of intellectual authority apart from caste and priesthood that the world has ever seen. With the fall of the Jewish State the scribes became the sole authority in the Church, and the results of their labors are preserved in the Talmud (q.v.), which gives the minutest details of their life and thought. Jewish terminology, however, confines the word *Sōphĕrīm* to the pre-Talmudic teachers. Consult Schürer, *History of the Jewish People in the Time of Jesus Christ* (Eng. trans., Edinburgh, 1890). For examples of the methods and thought of the scribes, consult Taylor, *Sayings of the Jewish Fathers* (i.e. the *Pirke Aboth;* Cambridge, 1877).

SCRIBE, skrēb, AUGUSTIN EUGÈNE (1791-1861). A French dramatist. Born in Paris, and educated for the law, he turned, at twenty, to the stage (*Les dervis*, 1811), but he won his first great successes with *Une nuit de la garde nationale* and *Flore et Zéphire* (1816), after which, alone or in collaboration, he poured out an almost unbroken succession of some 400 plays collected in 76 volumes, noteworthy for their interesting plots and light, sparkling dialogues, but most of all for their mastery of the technique of the stage. He essayed every kind of dramatic writing, tragedies, comedies, vaudevilles, opera libretti, collaborating with others and often being little more than editor of others' ideas. He was elected to the Academy in 1834. The best of his plays are, chronologically, *Valérie* (1822), *Le mariage d'argent* (1827), *Bertrand et Raton* (1833), *La camaraderie* (1833), *Le verre d'eau* (1840), *Une chaîne* (1841), *Adrienne Lecouvreur* (1849), *Les contes de la reine de Navarre* (1850), *Bataille de dames* (1851), and *Les doigts de fée* (1858). On the last three he worked with Legouvé. The more noted of his libretti are *Fra Diavolo* (1830), *Robert le Diable* (1831), *La Juive* (1835), *Les Huguenots* (1836), *La Favorite* (1840), *Le Prophète* (1849), *L'Africaine* (1865). Scribe wrote also some insignificant

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novels. His supremacy lay in the gift of discovering instinctively new and striking theatrical combinations. Scribe's local color is careless, his drawing of character weak, but from him Dumas the younger, Augier, and above all Sardou, learned that mastery of stagecraft, and of the routine of theatrical presentation, which has given France for half a century unquestioned leadership in the drama.

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SCRIBLERUS, MARTINUS, MEMOIRS OF. A satirical history, ridiculing affectation in learning, by John Arbuthnot, first published among Pope's works (1741). The hero had read everything, but lacked taste and judgment.

SCRIBLERUS CLUB. A literary club in London formed in 1714 by Swift, to which belonged Arbuthnot, Pope, Gay, Bolingbroke, and others. Its object was to satirize the prevalent false taste in literature; though it was short-lived, we owe to it Arbuthnot's *Martinus Scriblerus*, *Gulliver's Travels*, and indirectly Pope's *Dunciad*.

SCRIBNER, CHARLES (1821-71). An American publisher. He was born in New York City and educated at the University of New York and at Princeton College, where he graduated in 1840. He studied for the bar, but on account of feeble health did not practice, and in 1846 formed a partnership in New York with Isaac D. Baker in the book-selling and publishing business. The firm, or rather Mr. Scribner, for his partner soon died, acquired the works of such authors as Headley, Willis, Donald Mitchell ("Ik Marvel"), Dr. Holland, Dr. McCosh, Dr. Bushnell, etc. In 1857 Mr. Charles Welford became a partner, and a specialty was made of the importation of books from England. The partners also entered extensively into the publication of educational books, and in 1865 established *Hours at Home*, which in 1870 became *Scribner's Magazine*. This monthly, under the editorship of Dr. J. G. Holland, achieved great popularity, and was sold in 1881 and rechristened *The Century Magazine*. On the death of Mr. Scribner, the firm was reorganized under the name Scribner, Armstrong & Co.; the name of Charles Scribner's Sons was assumed in 1879, and eight years later the new *Scribner's Magazine* was established.

SCRIBNER, FRANK LAMSON (1851—). An American botanist, born in Cambridgeport, Mass., and educated at the Maine State College of Agriculture. He was connected with Girard College from 1876 to 1884, and in 1886 entered the Agricultural Bureau of the United States. From 1888 to 1894 he was professor of botany in the University of Tennessee. In 1894 he was appointed chief of the Division of Agrostology in the United States Department of Agriculture. He wrote many valuable papers on the grasses, a subject on which he ranks as a foremost American authority.

SCRIP (corrupted from *script*, Lat. *scriptum*, written paper, book, law, mark, neu. sg. of *scriptus*, p. p. of *scribere*, to write; influenced by popular etymology with *scrip*, wallet, pouch). A certificate of a right to a share or shares in a corporation, or to receive payment of money at a future date. Where a corporation is being organized, and the regular stock certificates have not been issued, it is customary to give subscribers scrip or 'scrip certificates,' as they are often called, for payments on account of their subscription to the capital stock, and this scrip may be exchanged later for certificates of stock. Scrip for paid-up subscriptions may be transferred in the same manner as certificates of stock, and the same principles of law apply as to the rights of the parties. Similar 'scrip' certificates are sometimes issued for sums less than the full value of a bond in a corporation, as in rebonding a corporation, which entitle the holder of a sufficient number to aggregate the face of a bond to exchange them for it. Corporations sometimes issue scrip dividends, where they desire to retain surplus earnings as working capital and increase their capital stock.

The term scrip was also commonly applied to the certificates issued by State banks which were designed to pass as currency. This scrip was merely a promise to pay the bearer the amount named on the face of the certificate, and was similar to United States Government 'greenbacks.'

Certificates or orders on stores issued by employers to employees are often called scrip, especially where they are issued in a series of values to correspond with United States currency. Such 'scrip' is, of course, not legal tender. Consult: Morse, *Banks and Banking* (3d ed., 1888); Morawetz, *Private Corporations* (2d ed., 1886); also see CORPORATION; DIVIDEND; MONEY; STOCK.

SCRIPTURE, EDWARD WHEELER (1864—). An American psychologist, born at Mason, N. H. He graduated at the College of the City of New York in 1884, and studied at Berlin, Zurich, and Leipzig. He was fellow at Clark University in 1891, and in the following year became instructor in experimental psychology at Yale and director of the psychological laboratory there in 1898. In addition to various psychological apparatus, he devised a method of producing anæsthesia by electricity, and of measuring hallucinations and imaginations. He wrote: *Thinking, Feeling, Doing* (1895); *The New Psychology* (1897); *Elements of Experimental Phonetics* (1902).

SCRIVENER, FREDERICK HENRY AMBROSE (1813-91). A distinguished English biblical scholar, born in London. He took his degree at Cambridge in 1835 and after a number of years' experience as a teacher he became in 1861 rector of Saint Gerrans, Cornwall, then vicar of Hendon, and prebendary of Exeter in 1876. Dr. Scrivener was much interested in the textual criticism of the New Testament and his labors in this field have proved eminently useful. His most important service was his *Plain Introduction to the Criticism of the New Testament* (1861; 4th ed., posthumous, edited by E. Miller, 1894). Other valuable publications were his edition of the famous Cambridge *Codex Bezæ*, edited with a critical introduction, annotations, and facsimiles (1864), and *The New Testament in the Original Greek*, according to the text fol-

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lowed in the Authorized Version, together with the changes adopted in the Revised Version (1881). Scrivener's critical principles were those of the old school, marked by reverence for the Textus Receptus.

SCRIVENER'S PALSY, or WRITER'S CRAMP. See NEUROSIS.

SCROFULA (Lat., diminutive of *scrofa*, sow), or STRUMA. A tuberculous affection manifested by enlargement of the lymph glands and defective nutrition of the tissues generally. The term has had a varied significance at different periods and among different writers on medical subjects, but at the present time scrofula is believed to be merely a manifestation of tuberculosis and to be due entirely to infection and subsequent irritation set up by the specific bacillus of that disease. By many authorities scrofula is looked upon as the 'pre-tuberculous' stage of consumption. It is certain that individuals with tubercular adenitis are prone to develop pulmonary tuberculosis, and the presence of these foci are a constant menace. On the other hand, many persons of exceptional bodily vigor are met with who in childhood had enlarged glands. Many manifestations of disordered blood conditions formerly grouped as scrofulous are now known to be either tuberculous or due to other and definite causes. For example, chronic inflammation of the joints, carious ulceration of the bones, ulcers of the cornea, eczema, and catarrhal states of the mucous membrane of the nose, were formerly classed as strumous.

Individuals of the lymphatic type are most liable to develop marked scrofulous symptoms. Heredity plays some part in the development of the disease, but it is more likely to arise from poor food and bad hygienic surroundings. The glandular enlargements are most frequently seen in the neck, but all the lymphatic glands of the body may be affected with little or no involvement of other portions of the organism. There is a tendency on the part of these glands to suppurate and form very chronic abscesses. Scrofulous children are liable to suffer from chronic bronchitis, diarrhœa, and catarrhal disorders of the nose and throat, and any intercurrent disease such as measles is apt to take a severe form with them.

The treatment of scrofula is chiefly hygienic and comprises fresh air, in abundance, warm clothing, and nutritious food. Cod-liver oil and the syrup of the iodide of iron are the most generally beneficial medicines, although iron, strychnine, and arsenic are excellent tonics. Local applications of iodine will help to reduce the enlarged glands. When these break down, however, or threaten to suppurate, thorough excision is the only efficient remedy, and the unsightly scars that result from long continued suppuration may thus be avoided.

The old English name for scrofula, 'the king's evil,' was derived from the belief that the disease could be cured by the royal touch. The faith in its efficacy was widespread, surviving several centuries. Both the English and French kings practiced this rite, originated, it is said, by Edward the Confessor.

SCROGGS, Sir WILLIAM (c.1623-83). An English jurist, born at Deddington, Oxford. He attended Oriel and Pembroke Colleges, Oxford, took his B.A. in 1640, and was admitted to Gray's Inn in 1641. During the Civil War he fought on the Royalist side and was called to the bar in 1653. In 1668 he was assigned as counsel for Sir William Penn in his proposed impeachment trial, and in 1676 was knighted and made a justice of the Court of Common Pleas. He was always subservient to the King and made political speeches from the bench. He was appointed Lord Chief Justice in 1678 and was called to the assistance of the Commons in the investigation of the Popish Plot (q.v.). In 1679 he presided over the trials of the accused and intimidated all witnesses for the defense, but at the trial of Sir George Wakeman, the Queen's physician, changed tactics and disparaged the evidence of Bedloe and Titus Oates. By this action he lost favor with the populace and was accused before the Privy Council, but was acquitted. By adjourning the Grand Jury on June 20 he prevented the indictment of the Duke of York as a Papist recusant. He was impeached by the House of Commons on the eight counts, but Parliament was abruptly dissolved and he was never tried. The next year he was removed from office, but was granted a pension of £1500 a year. Though a man of much ability, he was not a great lawyer, and no other judge except Jeffreys has so disgraced the bench.

SCROOGE, EBENEZER. A harsh, avaricious, utterly loveless old man in Dickens's *Christmas Carol*, who by a vision of the ghosts of Christmas, Past, Present, and To Come, is changed into a benevolent, cheerful person.

SCROPE, GEORGE JULIUS POULETT (1797-1876). An English geologist, born in London and educated at Harrow and at Saint John's College, Cambridge. He visited Italy in 1819 to study volcanoes, and after his marriage in 1821, when he took his wife's family name instead of his own, Thomson, traveled in Central France and again in Italy and was an eyewitness of the eruption of Vesuvius in October, 1822. With his intimate friend, Sir Charles Lyell, he attacked the prevailing Wernerian theory of volcanic action and advanced the uniformitarian doctrine, insisting at the same time on adherence to the method of actual observation of natural phenomena. But his great fame is as a geologist, and he must rank as one of the most logical and clear thinkers among the natural scientists of his day. He wrote *Considerations on Volcanoes* (1828; 2d ed. 1862) and *Geology of the Extinct Volcanoes of Central France* (1827; 2d ed. 1872).

SCROPH'ULA'RIA'CEÆ (Neo-Lat. nom. pl., from *Scrophularia*, from Lat. *scrofulæ*, scrofula; so called either because believed to be a remedy for scrofula, or because the knots on the roots were supposed to resemble scrofula). THE FIGWORT FAMILY. A large and widely distributed natural order of dicotyledonous plants embracing about 180 genera and 2000 species, chiefly herbs and sub-shrubs, and also a few trees (Paulownia). They are adapted to many different habitats and some show marked modifications due to their surroundings. Some species are semi-parasitic upon the roots of other plants, although they retain their green coloration. Some New Zealand species resemble certain conifers. Many species are grown as ornamentals, as calceolaria, snapdragon, speedwell, mimulus,

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pentstemon, etc. Some have been used medicinally.

SCRUPLE. A character in John Wilson's comedy *The Cheats* (performed 1663). He is a Nonconformist minister, touched with a satiric hand, as when he calls the strong liquor which he drinks "too good for the wicked; it may strengthen them in their enormities."

SCRUTIN DE LISTE, skrụ'tăn' de lêst (Fr., voting by list). A method of electing members of the French Chamber of Deputies. According to this method of *scrutin de liste* all the Deputies of a given department are elected on a general ticket, each elector voting for the whole list—the method by which Presidential electors in the United States are chosen. This method was introduced in 1885 with the view of swamping the minority party and removing the Deputies from the strong pressure of local petty interests. It did not, however, prove satisfactory to the majority, and the arrondissement or single-district method was reëstablished in 1889.

SCUD'DER, Henry Martyn (1822-95). An American missionary and minister. He was born at Panditeripo, Ceylon, the son of the Rev. John Scudder, a missionary of the (Dutch) Reformed Church. He was graduated at the University of the City of New York in 1840 and Union Theological Seminary in 1843. The following year he went as missionary to Madura, India. Here he established a hospital and dispensary, having received the degree of M.D. in 1853. In 1864 he returned to the United States and filled pastorates in San Francisco (1865), Brooklyn (1872), and Chicago (1882). From 1887 to 1889 he was again in the mission field in Japan. He published a number of books in the Sanskrit, Tamil, and Telugu languages.

SCUDDER, Horace Elisha (1838-1902). An American author and editor, born in Boston, Mass. He graduated from Williams College in 1858 and then taught school in New York City. Subsequently, removing to Boston, he devoted himself to literary work. In 1867 he was made editor of the *Riverside Magazine for Young People.* In 1890 he succeeded Thomas Bailey Aldrich as editor of the *Atlantic Monthly.* Although a critic and biographer of recognized ability and an influential man of letters by virtue of his position as editor and literary adviser, he was probably most widely known as a writer of juvenile books, such as *Seven Little People and Their Friends* (1862) and the *Bodley Books,* in eight volumes (1875-85). Other titles of his works are: *Life and Letters of David Coit Scudder* (1864), *Stories from My Attic* (1869), *Stories and Romances* (1880), *Noah Webster* ("American Men of Letters," 1882), *A History of the United States* (1884), *Men and Letters* (1887), *George Washington* (1889), and *Childhood in Literature and Art* (1894). Doubtless his most important single work is his biography of James Russell Lowell (1901), which presents with fullness, accuracy, and sympathy the chief phases of literary life in New England, with which the biographer himself was throughout his life in touch. Scudder also prepared, with Mrs. Taylor, the *Life and Letters of Bayard Taylor* (1884), and was editor of the "American Commonwealths Series."

SCUDDER, Samuel Hubbard (1837—). An American entomologist, born in Boston. He was graduated at Williams College and at Harvard University. From 1864 to 1870 he was custodian of the Boston Society of Natural History, and its president from 1880 to 1887. He was an assistant librarian at Harvard from 1879 to 1882; was attached to the United States Geological Survey from 1886 to 1892; became a member of the National Academy of Science in 1887, and has been an honorary or corresponding member of several foreign societies. An authority on North American butterflies and orthoptera, he has also a world-wide reputation as an investigator of fossil insects, myriapods, and arachnida. He has discussed the subjects of antigeny and digoneutism, proposing these terms, and has made elaborate studies on the larval histories and on the ecology of butterflies. His publications are very numerous, comprising: *Butterflies of the Eastern United States and Canada* (New York, 1887-89); *The Fossil Insects of North America* (ib., 1890); *Index to the Known Fossil Insects of the World* (Washington, 1891); *Tertiary Rhynchophorous Coleoptera of the United States* (ib., 1893); *Revision of the Orthopteran Group Melanopli* (ib., 1897); *Catalogue of the Described Orthoptera of the United States and Canada* (1900); *Adephagous and Clavicorn Coleoptera from the Tertiary Deposits at Florissant, Colorado* (Washington, 1900); *Index to North American Orthoptera* (Boston, 1901).

SCUDDER, Vida Dutten (1861—). An American educator and writer, born in India. She graduated at Smith College in 1884, and after studying at Oxford and in Paris became associate professor of English literature at Wellesley College. Her publications include: *The Life of the Spirit in the Modern English Poets* (1895); *The Witness of Denial* (1896); *Social Ideals in English Letters* (1898); and an *Introduction to the Study of English Literature* (1901).

SCUDÉRY, skụ'dâ'rē', Georges de (1601-67). A French poet and playwright, born at Havre. He was popular in his time, but is now remembered chiefly through Boileau's satire, and as being the brother of the celebrated Madeleine de Scudéry, who published many of her works under his name. He served in the artillery until 1630, when his literary interests drew him to Paris. By means of assiduous flattery and an adroit polemic against Corneille, Scudéry received from Richelieu in 1643 an appointment as Governor of Notre Dame de la Garde, near Marseilles, which he retained until 1658. In 1650 he was elected to the Academy. Scudéry's numerous works include: *La comédie des comédiens* (1634); *La mort de César* (1636); *Arminius* (1643); and a pretentious epic *Alaric* (1654), which was honored by Boileau's most cutting satire.

SCUDÉRY, Madeleine de (1607-1701). A French novelist, born at Havre. She was left an orphan at six, was well educated by an uncle, and, with her scapegrace brother Georges, went to Paris in 1630, where her wit and good sense soon won her high rank in the brilliant society of the Hôtel de Rambouillet. Her early writing was done under the name of her brother Georges, who seems to have collaborated with her in battle scenes, general plan, prefaces, and dedications, and is said in days of need to have kept his sister under lock to secure steady production.

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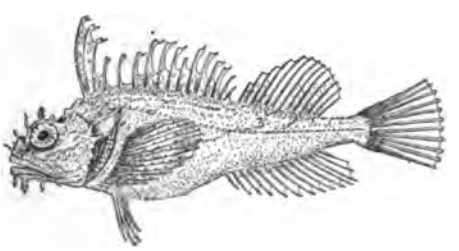
She soon became prominent in society and her salon was much frequented. Her novels are: *Ibrahim* (4 vols., 1641); *Artamène ou le grand Cyrus* (10 vols., 1649-53); *Clélie* (10 vols., 1654-60); *Almahide* (1660); and *Mathilde* (1667). For a generation after its publication the *Grand Cyrus*, which in classic guise depicted French society, was known and studied in all circles that aspired to literary refinement. The longest novel of the world was also the most profitable of the period. The *Grand Cyrus* is not a story, but a framework for conversation, reflection, analytic portraiture. She painted French aristocracy in the *Grand Cyrus* and the bourgeoisie of the new culture in *Clélie*. The characters of her stories were easily recognized as portraits of prominent persons of the day. Her later novels, Spanish and Italian in scene, are insignificant, though regarded as novels they are her best. She tactfully yielded to the literary ideals of the school of 1660, voiced in Boileau's *Dialogue des héros*, and passed the last forty years of an honored life with the common esteem of people as different in temper and ideals as Racine and La Fontaine, Condé and Madame de Sévigné. Her *Correspondance* is of much literary interest. Consult: Cousin, *La société française au XVIIème siècle* (Paris, 1858); Sainte-Beuve, *Causeries*, vol. iv. (ib., 1857-62); Le Breton, *Le roman au XVIIème siècle* (ib., 1890); and Mason, *The Women of the French Salons* (New York, 1891). Summaries of the stories and keys to the characters may be found in Körting, *Geschichte des französischen Romans im 17ten Jahrhundert* (Oppeln, 1891).

SCULPIN (of unknown etymology), or SEA ROBIN. One of the small, strange, spiny marine fishes of the family Cottidæ (q.v.), about 250 species of which inhabit rocky shores in northern regions and are known as 'miller's thumbs,' 'dragonets,' 'father-lashers,' 'Irish lords' (qq.v.); while the name is given in California to certain fishes of the related family Scorpænidæ. Some, like the 'sea-raven' (q.v.), are large and brilliant, but most of them are mottled in browns, yellows,



A SCULPIN (*Hemitripterus Americanus*).

and blacks. They are grotesque in shape and resemble 'bullhead' catfish with a warted body, many fleshy appendages, and the fins grotesquely elongated and fluttering with 'rags.' These fishes lurk about rocky and weedy places, seeking small animals for food, and are a source of annoyance to fishermen, whose bait they steal. They render service as scavengers about fish-curing stations and furnish an abundance of food for larger fishes.

SCULPTURE (Lat. *sculptura*, from *sculpere*, to carve, cut out of stone). A term including all methods of producing a purely artistic result in solid form, as distinguished from architecture, in which utilitarian work is beautified, and the representation of solid form on a flat surface, for which see DRAWING; PAINTING.

PROCESSES AND MATERIALS. The processes used in sculpture, each of which involves the practice of a separate art, are of radically different character. There is, first, carving with the sharp tool in a substance sufficiently solid and hard to resist the tool, such as stone of different kinds, ivory in all ages or wherever a little luxury was possible (and, as a substitute for ivory, bone), and wood. These are the more common materials; but there is nothing hard which has not been used for sculpture. There are statuettes in rock crystal; Chinese carvings in jade are famous; cameos in antiquity and in modern times are wrought in onyx, and intaglios or incised sculptures are cut in chalcedony, sard, and amethyst. Artists working for Roman nobles under the Empire and modern artists in France, imitating and surpassing them, have worked in several hard materials in a single composition so as to produce a polychromatic effect.

Artistic form is also produced by means of modeling in soft material; wax is peculiarly susceptible of free handling and will retain perfectly the form given to it; it has been employed, therefore, in statuettes, busts, and medallions at many epochs in the history of art. Moreover, as it will receive and retain coloring very perfectly, it has been a common medium for polychromatic sculpture. Clay, the material of ceramic art, is equally susceptible of artistic treatment when no intention exists of fixing its form by heat. It is used in this way by the artist for the original small study as well as for modeling the whole figure or group to be produced. If the clay be of a kind good for the purposes of the potter, the piece as originally modeled may be fired and produce a terra-cotta bust or statuette. Such sculpture in terra-cotta is identified with some splendid periods of art. See TERRA-COTTA.

The metals are used in two ways: First, they are cast, and for the purposes of the artist in cast metal the plastic materials mentioned in the last paragraph above are eminently fitted. The mold for a casting in bronze or silver can be made directly or at one remove, from the clay model; and this mold may suffice for one or for many castings, according to the system adopted. These castings may be finished by hand; the file, the chasing tool, even the cutting edge of what is really a chisel may all be called into use to perfect the forms at the sculptor's will. In very recent times some of the great European iron foundries have tried to do artistic work in the hard material we call cast iron; but this they could only do by singular perfection of molding and casting—in short, by mechanical skill and foresight, as the material hardly allows of finishing by hand. Bronze is by far the most common material for this purpose and has lent itself for thousands of years to the work of the sculptor on a very large scale, and also in minute pieces of ornamentation. Silver and gold, and in modern times tin, either pure or slightly hardened by the admixture of another metal, are materials constantly in use. The artistic goldsmith work for ecclesiastic and civil display has always been a fruitful field for the sculptor. See METAL-WORK; FOUNDING.

Metal may also be used in a quasi-plastic way,

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for the great tenacity of copper and the somewhat less but still available toughness and expansibility of bronze, together with the perfect ease with which the precious metals can be manipulated in this way, have always induced the artist to work in thin plates, embossing them by hammering from the 'wrong' side and then chasing and perhaps engraving the face so as to modify the original embossing. (See REPOUSSÉE.) This is done on a very large scale in the case of colossal bronze statues, which are commonly made of plates of bronze hammered into reliefs and depressions and afterwards bolted together, and also in producing small decorative vessels.

FORMS OF SCULPTURE. As to its form and character sculpture is divisible into that which is in relief (see RELIEF SCULPTURE), in which the masses project slightly from a solid surface, and that 'in the round,' to use a phrase common among artists and which denotes statues, busts, free groups, and the like. It is, of course, difficult to draw this line of demarcation very sharply; thus there are terra-cotta statuettes of the Asiatic Greek epoch and modern carvings, both Oriental and Western, in which a flat plate of material is cut through (pierced, or à jour) and is carved or molded on one side only into its characteristic and expressive forms. This is in fact a relief without a background. A similar doubt arises in the case of figures in very high relief. In compositions of this character it often happens that a head, a limb, or even a whole figure, except for a small point of attachment, is free from the background, as in the statues filling the pediments of Greek temples, and the carving of the Gothic churches of the fourteenth century in France and elsewhere.

There is one form of sculpture in which the background has not been smoothed off by the removal of the solid material down to the level of the ground of the relief. This is seen on a large scale in the wall-sculptures of Egyptian pylons and propylons, and in the eighteenth-century ivory work of the Japanese, and is what is known as cœlanaglyphic sculpture, or, more simply, concavo-convex sculpture. It is really a process of detaching a certain part of a larger surface by means of an outline formed by an incision, and the further process of manipulating everything within that incision until the head so bounded becomes much more than a mere delineation and is wrought into modulations of surface until a semblance of solid form is secured.

THE SCULPTOR AT WORK. A model of clay is commonly used in all works of sculpture. In works of cast metal (see FOUNDING) the sculptor's activity, except the final chiseling of the metal, ends with the model from which the statue is made. In marbles the Greeks, indeed, are reputed to have worked sometimes without one, and Michelangelo seems to have used only a small wax model or a sketch. The usual modern process is to make a preliminary sketch of wax or clay on a small scale. An iron skeleton of about the proportions of the intended statue is then set upon a stand with a movable top, enabling the sculptor to work conveniently on all sides. Upon this skeleton modeling clay, moistened by water or stearin and glycerin, is laid, and the sculptor models the figure with bone and wooden tools. When the model is finished piece-molds of plaster are applied from which the statue is cast in plaster.

The conversion of this model into stone is a more complicated process. The model and the block to be carved are placed upon similar pedestals near each other, and by aid of a mechanical device, called the pointing machine, holes are drilled into the marble of the same depth as the depressions upon the surface of the model. The correspondence between the model and the block was formerly indicated by a series of marks made upon each, which enabled the assistant to locate the holes to be drilled. But now a more exact device is used, consisting of a T-shaped instrument by means of which the three most prominent points of the model are fixed upon the stone, and from these points others are gained by an elaborate similar process of triangulation. From the holes thus drilled a trained stone-cutter (*scarpellino*) rough-hews the stone, leaving only the completion for the sculptor.

HISTORY. It is the purpose of this article to treat the development of modern as distinguished from ancient sculpture. That of the Oriental peoples, whose art is principally decorative, has been treated under such heads as CHINESE ART; JAPANESE ART; INDIAN ART; that of the ancient peoples whose art is not connected with the general development under EGYPTIAN, BABYLONIAN, and ASSYRIAN ART. Classic sculpture, which under the Greeks attained its most perfect development, is treated under GREEK ART; ROMAN ART. That of the Middle Ages, which is entirely dependent upon architecture, is best treated under the chief mediæval epochs. (See CHRISTIAN, ROMANESQUE, and GOTHIC ART.) With the Italian Renaissance modern sculpture begins. With its emancipation from architecture the individual artist becomes of importance. It will be found convenient to treat this part of the subject under the two headings, 'the Renaissance' and 'Modern Sculpture.' The first includes the great revival of the fifteenth and sixteenth centuries, to which may be appended the mannered art of the seventeenth and eighteenth centuries as emanating from the same source. With the nineteenth century begins modern art *par excellence*, achieving results most radically different from the ancient period.

THE RENAISSANCE.

FIRST REVIVAL IN ITALY. The chief revival of the art of sculpture, marking, indeed, the origin of Italian and through it of modern sculpture, occurred in Italy during the thirteenth century. There was a general revival in the peninsula, following classic models, with Southern Italy, Rome, and Pisa as the chief centres, of which only the latter was destined to prevail. (See GOTHIC ART.) Here the father of the art was Niccola Pisano (c.1206-c.1280). In form and in subject his art is a continuation of Tuscan Romanesque, but differing from it in that its inspiration was antique art. His models were late Roman reliefs and sarcophagi, which he imitated not only in figures and in style, but even in technique, as for example in the conspicuous use of the drill. The expression of the faces is serious and noble, and the treatment of the nude is surprisingly good, but the draperies are heavy and the composition is overcrowded. Of his pupils Arnolfo di Cambio, chiefly celebrated as an architect, and Guglielmo d'Agnolo followed his classical tendencies, but his son Giovanni Pisano

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(died 1320) gradually evolved a style, the chief characteristics of which were naturalism and dramatic, even extravagant action. It was, indeed, an independent version of the Gothic style, with its strong religious and allegorical elements, that he introduced into Italy. His influence was decisive upon Italian art. Independent schools of sculpture arose at Florence and Siena, and branches of the Pisan school were established at Milan and Naples during the fourteenth century.

At Florence Andrea Pisano's (d. c.1349) reliefs on Giotto's Campanile and other works show a higher development of symbolism, more perfect technique, simpler composition, and more restrained action than Giovanni's. He perfected the hitherto crude art of casting bronze in relief to the highest extent attained before the Renaissance. Andrea's sons found employment at Pisa, but his successor at Florence was Andrea Orcagna (d. 1368). Although more extensively occupied with painting and architecture than with sculpture, his work is in some respects an advance upon that of Andrea Pisano. The beautiful tabernacle of Orsanmichele shows him more picturesque and dramatic in style, richer in composition, and grander in form, but a trifle inferior in detail and with less sense for the significant. The Sienese school was inferior to the Florentine during this epoch, being rather picturesque and narrative in character, without a true understanding of form. Its chief works are the sculptures on the façades of the cathedrals at Siena and Orvieto, the latter probably designed by Maitani, and the most important work of its kind in Italy.

Early Renaissance. As in painting and in architecture, the Renaissance (q.v.) opened a new world in sculpture. The sources of inspiration were the same as in painting, viz. the study of nature and of the antique, with this difference, that in sculpture the influence of the antique was stronger, owing to the survival of antique statuary. But although the antique from the beginning made itself strongly felt in decoration, and furnished motives, sometimes even figures, to the sculptor, it did not materially influence the general treatment, line or modeling, the prevailing characteristic of which, during the Early Renaissance, was a healthy naturalism. In relief, as in statuary, the highest development was attained; in the former, indeed, some of the qualities of painting, such as the use of color and perspective, were adopted. Marble backgrounds, when not sculptured, were painted blue; other parts, like hair and angels' wings, were gilded, as were usually bronzes, while terra-cottas were colored to rival painting itself. The art of sculpture, which in the preceding centuries had been mainly a Tuscan product, now became essentially Florentine.

In Florence the beginnings of the new movement appeared toward the end of the fourteenth century in the works of such sculptors as Piero di Giovanni Tedesco, which, though still Gothic, display a new naturalism; and somewhat later in those of Nanni di Banco (d. 1420), showing both naturalism and a remarkable resemblance to Roman portrait statues. The Renaissance achieved a complete victory in the works of Ghiberti, Donatello, and Luca della Robbia—the principal figures in the first half of the fifteenth century. Lorenzo Ghiberti (1378-1455) was essentially a goldsmith, achieving his highest triumphs in this art and in bronze relief, in which he attained the highest perfection. His first doors of the Florentine Baptistery, compared with Andrea Pisano's, show the advance of the new art in naturalistic treatment, beauty of form and grace of draperies, richer composition and skill in relief; his famous "Paradise Portals" show besides a masterly treatment of sculptural perspective, in which he surpassed all contemporaries. See Plate under Ghiberti.

The greatest sculptor of the Early Renaissance, and, indeed, one of the greatest of all times, was Donatello (c.1386-1466). Although leavened by the antique, his art was realism of the highest type; he sought the characteristic, even at the sacrifice of beauty. He understood perfectly the handling of the materials, achieving the highest effects, whether in marble or in bronze, and he was equally good in statuary or relief. His art dominated Italian sculpture till the advent of Michelangelo. Michelozzi (1391-1472), his associate, excelled as a bronze-founder, but shows in his own designs a talent sufficiently mediocre. The art of Luca della Robbia (1399-1482) was midway between that of Donatello and Ghiberti, uniting charm of color with beauty of form. His best known achievements are in the celebrated terra-cotta ware which he invented, but in his "Singing Galleries" and other works he showed equal mastery over marble, especially in composition, and he also worked with some success in bronze. His nephew Andrea della Robbia (1437-1528) introduced terra-cottas into the smaller towns of Italy, and, though more sentimental and less dignified than Luca, he produced very graceful works. Other members of the family carried on the art for a century and a half.

During the second half of the fifteenth century the demand for sculpture continued in the main ecclesiastical, and gave occasion for numbers of tombs, pulpits, tabernacles, and friezes. Donatello's principal pupil was Andrea del Verrocchio (1435-88), originally a goldsmith, who worked chiefly in bronze. Though more angular than his master's, his art is powerful and shows a high sense of beauty. In the statue of Bartolommeo Colleoni at Venice he produced the finest equestrian statue of the Renaissance, if not of all times. Another bronze worker of importance was Antonio Pollajuolo (1429-98), whose art, like Verrocchio's, was angular and realistic, but was without his sense of beauty. The marble workers of the later fifteenth century sought to combine beauty of form and charm of presentation with Donatello's naturalism. Desiderio da Settignano (1428-64) added elegance and harmony to Donatello's realism, and did decorative work of the highest order. Bernardo Rossellino (1409-64), though lacking in originality, excelled in architectural arrangement and in his tomb of Leonardo Bruni (Santa Croce) created a model for the Early Renaissance. Antonio Rossellino (1427-78), his younger brother, shows rather the influence of Desiderio in the delicacy and charm of his work. Benedetto da Majano (1442-97), the celebrated architect, continued the same tendencies as a sculptor, and in the pulpit at Santa Croce, the most beautiful of the Renaissance, he solved the problem of perspective in marble-carving. Mino da Fiesole (1431-84) is widely known because of the large number

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of his works, which possess a certain naïvete and decorative quality, but are often mannered.

At Siena there was an independent school, the chief characteristics of which were sentimental tendencies and elaborate architectural decoration. A typical Sienese artist was Lorenzo Vecchietta (d. 1480). The greatest master of the school, Jacopo della Quercia (1371-1438), represents the transition from the Gothic. Neglecting form and detail, he seeks to give his figures life, exhibited in motion. Under Quercia's influence stood Niccolo dell Arca (1414-94), at Bologna, and he in turn gave impulse to Guido Mazzoni (1450-1518) of Modena, the principal sculptor, during this period, of painted terra-cotta groups, generally placed in a niche or chapel. He represented, with great realism, the Italian peasant as participant in sacred story—a species of work most popular with the people.

At Padua the influence of Donatello was paramount. In Lombardy, too, the influence came from Florence, with the activity of Michelozzo at Milan, though this school was somewhat influenced by neighboring German art. Its chief characteristics were luxurious decorations and the multiplication of details, executed, however, in a crisp and vigorous style. Its chief monuments are the sculptures of the cathedral at Milan, of the Certosa at Pavia, and of the Colleoni Chapel at Bergamo, and the principal masters are Omodeo (d. 1522), Cristoforo Solari (d. 1523), Caradossa (d. 1527), and Busti (d. 1548). The influence of Milan prevailed throughout the northern part of Italy as far east as Verona.

In Venice sculpture was closely united with architecture. It was richly decorative in character and luxuriant in form, being softer and more sensuous than the Milanese or Florentine. Gothic forms lingered longer here than elsewhere, as is shown in the beautiful Porto della Carta (1438-43) of the Ducal Palace, by Bartolommeo Buon, representing the transition to the Renaissance forms. The later work of Antonio Rizzio, however, belongs to the best that the Early Renaissance has produced. Pietro Lombardo (d. 1515) is thoroughly Renaissance in style, and characteristically Venetian in ornamentation, as may be specially seen in the decorations of Santa Maria dei Miracoli. His sons Tullio and Pietro, together with Alessandro Leopardi (d. 1522), present the remarkable spectacle of artists seeking inspiration in Greek monuments instead of the customary Roman, exactly as Canova did at Venice three centuries later, and achieving fine decorative results.

High Renaissance (sixteenth century). Sculpture now became freer than at any previous period, being no longer dependent upon architecture as in the Gothic epoch, or even upon decoration, as in the fifteenth century. It was allotted a more important place by architecture than previously; indeed, architecture itself became sculpturesque—a framing for statues or monuments. Half colossal or even colossal figures were used in place of the former life-size figures, and new types of biblical subjects were invented. At first there was a deeper study of the antique, which gave a monumental style and universal type; but this soon degenerated into a mannered imitation of the great masters who acquired it.

Florence again furnished the greatest geniuses. Among the first to enter the new path was Andrea Sansovino (1460-1529), a follower of Verrocchio, called the Raphael of sculpture. With all beauty of form, however, his work shows a lack of originality, and his later statues are mannered. More original in fancy, but not his equal in technique, was Benedetto da Rovezzano (1476-1556), who excelled as a decorator. Torrigiano (1472-1522) introduced the Italian Renaissance into England and into Spain, while Tribolo (1485-1550), a Florentine chiefly active in Bologna, was prevented by misfortunes from attaining the higher rank that his early work promised.

The greatest of the Florentines, and, indeed, the greatest sculptor in modern art, was Michelangelo, 'the man of destiny,' in whose hands were placed the life and death of sculpture. To a perfect knowledge of anatomy and perfect skill in line, he added an equal technical ability in the treatment of the marble. Using the action of the human figure as expressive of emotion, he developed a style which was the culmination of that of Donatello, Quercia, and Signorelli. Its chief characteristics were gigantic, highly developed forms combined with intense dramatic action, and these qualities, which the Italians call *terribilità*, dominated the sculpture of the remaining sixteenth century, and, indeed, of the seventeenth and eighteenth. Not possessing his genius, and impelled by the demand for rapid production, his followers produced works without real feeling and mannered in character. His pupils and followers show no particular individuality. Bandinelli (1488-1560) was, in spite of himself, a mere imitator of Michelangelo, and his pupil Ammanati (1511-92) was even worse. Brilliant exceptions to the general mediocrity were the Florentine bronze sculptors Benvenuto Cellini (1500-71) and Jean Boulogne (1524-1608), by birth a Fleming.

In Venice the chief master was the Florentine Jacopo Sansovino (1477-1570), a pupil of Andrea Sansovino, who modified his style to suit the rich decorative effects demanded there. His pupils, like Girolamo Campagna, produced good work after the rest of Italy had sunk into mannerism. But during the two following centuries came the same decline.

Sculpture of the seventeenth century in Italy was dominated by Giovanni Lorenzo Bernini (1598-1680), active chiefly at Rome. He was a most skillful technician, but in his exaggerated works failed to recognize the limitations of sculpture. His followers, like Algardi and Maderna, lost even the capacity for great ideas, and were hopelessly mannered and extravagant.

The French Renaissance. During the fifteenth and still more during the sixteenth century the Italian influence spread throughout Europe, at first propagated by Italian sculptors who were summoned abroad. The Renaissance of sculpture appeared much sooner in Northern Europe than did the Italian influence. Before this event the observation of nature had partially transformed mediæval sculpture and painting, and the ensuing amalgamation produced an art which remained essentially national in character.

During the fifteenth century a style of sculpture prevailed in France analogous to that of the Netherlands, the chief characteristic of which was a pictorial naturalism. The works of Claux Sluter at Dijon exercised a wide influence, and the greatest French sculptor of the period, Michel

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Colombe, is said to have been his pupil. Italian influence was greatly strengthened by the expedition of Charles VIII. to Italy, especially through Perréal, the King's director of art. The principal school of the period was at Tours, and its greatest master was Michel Colombe (1432-c.1515), whose work is worthy of comparison with the best of the early Italian Renaissance. He at first worked in the native style, but he gradually combined Italian grace and beauty of form with a rare naturalism. Antoine Juste (d. 1519) and his brother Jean Juste (d. 1534) were Florentines by birth, but even they ultimately adopted the French style of figures.

In the early sixteenth century the patronage of Francis I. greatly promoted the Italian influence, which was stronger in the south than in the north. During the first half of the century decorations like those in the cloisters of Saint Martin at Tours and the choir screen at Chartres rival the most delicate Florentine decoration, and during the latter half of the sixteenth century figure sculpture attained its highest development in the persons of Bontemps, Goujon, and Pilon. Pierre Bontemps, who flourished about the middle of the century, represents the native influence in its powerful naturalism, while Jean Goujon (c.1520-c.72), perhaps the greatest French sculptor of the Renaissance, shows the native style transformed by Italian grace and beauty. He was without a rival in his wonderful manner of filling in architectural space, and portrayed the female figure in beautiful rhythmic lines. Germain Pilon (d. 1590?) possessed a more vigorous talent, being a fine anatomist and a man of science. He was only gradually influenced by the Italian style, which, however, he finally adopted to the extent of occasional mannerism. His best pupil was Prieur (d. 1611). All of these men worked under royal patronage and in close association with the King's architects, whence the excellent decorative character of their work. Outside of Paris local schools at Toulouse, Troyes, and elsewhere show the same tendencies. In Lorraine Richier (1500-57), the French Begarelli, was mediæval in spirit, though finally adopting Renaissance forms.

In the early seventeenth century the Italian influence increased with the stay in Italy of men like Guillain and Sarrazin. This influence, however, had changed to the mannered forms of the Baroque, although the Frenchmen tempered it by a certain grace, which was national in character. Under Louis XIV. sculpture became pompous and exaggerated, retaining good decorative qualities. The greatest genius of the century was Pierre Puget (1622-94), a native of Marseilles, whose Italian training shows the influence of Bernini and Algardi. Though often exaggerated in form, his work is of wonderful technical ability and full of Provençal fire. At Court the pompous Girardon (1630-1715) was representative sculptor and the head of a large school. Coysevox (1640-1720) was more original and measured, and his pupils, the brothers Coustou, in the graceful character of their work, foreshadow the eighteenth century.

During the eighteenth century exaggerated form gave place to a sort of courtly grace and delicate sentiment, and sculptors occupied themselves with the rendition of individuality and the technical treatment of marble. A healthy realism, manifesting itself chiefly in portraiture, gradually developed. Lemoyne designed pompous monuments, and better busts; Bouchardon (d. 1762) is more measured in his characteristic busts and his charming antiques; and Pigalle (d. 1785) united great technical ability with a brilliant temperament. Jacques Caffiéri and Augustin Pajou (d. 1809) are chiefly known for their fine and graceful busts; Claude Michel (1738-1814), called 'Clodion,' executed minor works of household art, of a light and charming character, chiefly in terra-cotta. All that was best in French sculpture of the eighteenth century culminated in Jean Antoine Houdon (1741-1828), a pupil of Lemoyne and Pigalle, who, though capable of creating beautiful and ideal works, was chiefly active as a portraitist, in an art essentially realistic and modern.

German Renaissance. In Germany the emancipation of sculpture from the Gothic was very slow; throughout the fifteenth century we find the influence of the Gothic forms. Its course of development followed that of painting, and so we find German sculpture pictorial in character, richly colored and gilded, and in elaborate Gothic framing. Its chief activity was in large carved altar pieces and religious figures. The chief difference between German sculpture and Italian consists in German lack of the sense of beauty and form. Draperies were not treated to show the outline of the figure, but rather to conceal it. But German sculpture was all the more naturalistic because of the absence of classic influence, and its most pleasing manifestation was the expression and delineation of character in the human face. Even when, in the sixteenth century, the Italian influence entered Germany, it was less important than in other countries. The German schools are divided into two groups: the South German, which is more monumental in character, reflecting the Italian influence; and the North German, which was shaped by the Netherlands.

The most important school was the Franconian, and its chief centre was at Nuremberg. The first sculptor of prominence there was the well-known painter Michael Wohlgemuth (1434-1519), who designed a large number of wooden altar pieces, the style of which, characterized by earnest expression and minute naturalism, resembles that of his paintings. Veit Stoss (1440-1533), the principal wood-carver of the school, executed altar pieces more plastic in character and dramatic in action. His figures were varied and highly individual, but the composition was restless and overcrowded, with too much striving after effect. Contemporary with these masters lived a number of anonymous artists, whose work, like "Our Lady of Sorrows" in the Germanic Museum, shows great ability. The foremost stonecutter of the Nuremberg school was Adam Kraft (c.1440-1507), whose style is simpler and more dignified than that of Stoss, deeper in feeling, more realistic and careful in execution. The chief bronze-founder of the German Renaissance was Peter Vischer (c.1455-1529). In his works, like the shrine of Saint Sebaldus and the statues of the monument of Maximilian, at Innsbruck, the Italian Renaissance first appears in German sculpture. The same influence appears more prominently in the work of his sons, Hermann and Peter, who assisted him.

In Nether Franconia there were a number of important sculptors, like the master of the

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Creglingen altar (1487), whose measured and serious work shows some Italian influence, as does to a greater extent that of Tilman Riemenschneider (1460-1531), the chief master of the Würzburg school. The work of the Swabian school is characterized by a greater grace and charm, as may be especially seen in the choir stalls of the Minster at Ulm, carved by Jörg Syrlin. This is even more the case in Bavaria and Tyrol, where the chief master, Michael Pacher (d. 1498), displays a German naturalism modified by a highly developed sense of the beautiful, much like Italian work.

In Middle and Northern Germany the prevailing influence radiated from the Netherlands, producing an art which was pictorial in execution and crowded in composition. The stone monuments of the middle Rhine have perished, but along the lower Rhine and in Northern Germany wood-carving was very generally practiced, the finest surviving monument being the beautiful carved altar of Schleswig (1515-21), by Hans Brüggemann. Its powerful naturalism and high dramatic action show distinct Dutch influence. Fine stone-carving was also done in the mining district of Saxony, near the Bohemian boundary, as may be seen in the beautiful portal of the Church of Annaberg.

After about 1530 foreign artists were mostly employed, Italians in the south, Netherlanders in the north. The Thirty Years' War put an end to all artistic activity. The greatest German artist of the Baroque period, during which foreign artists were chiefly employed, was Andreas Schlüter (1664-1714), active chiefly at Berlin. Though the monumental character of his work shows the influence of Bernini, his conception of form and general treatment were derived from the Netherlands. Raphael Donner (1692-1741) held a similar position in Austria, but his reaction against the Rococo was based on the study of nature and the antique.

Other Countries. The sculptures of the Netherlands were largely destroyed during the Reformation. Here the northern Renaissance began earlier than anywhere else—at the end of the fourteenth century, even preceding the revival of painting. The centre from which this revival proceeded was Dijon, in Burgundy, where under the patronage of the dukes a number of important masters were active, the chief among whom was the Dutchman Claux Sluter. While still Gothic in the draperies, his figures display a powerful naturalism, combined with a high plastic sense. This naturalistic art dominated the Netherlands during the fifteenth century, and it was not until the sixteenth that the Italian influence appeared. It manifested itself chiefly in the charming decorations, but, although good work was produced, no individual artists of prominence are recorded, except Jean Boulogne, whose art was practically Italian. In the seventeenth century the school of Antwerp came into prominence. François Duquesnoy (1594-1644), the chief master, has been compared to Rubens, and in spite of his training in the Italian Baroque he maintained some dignity of style. His pupil, Artus Quellinus (1609-88), active chiefly in Amsterdam, had a wide influence in Germany. In the eighteenth century sculpture in the Netherlands declined, the Flemish school showing increasing mannerism, while the Dutch was more naturalistic.

To the early Netherlandish influence prevailing in Spain, succeeded, in the fifteenth century, a transitional, semi-Italian style. Italian artists continued to be summoned to Spain, and in the sixteenth century a more monumental style, the chief characteristic of which is richness of decoration, arose. Sculpture found wide employment in rich altars, retables, and reredoses. The best known representative of this high Renaissance is Berruguete (d. 1561), whose fantastic style was modeled upon Michelangelo. Similarly mannered were the brothers Leoni, chief sculptors to Philip II. In the seventeenth century a realistic reaction, corresponding to that in painting, originated in Andalusia (Seville), the chief representative of which was Martinez Montañes, who sought above all to express energy and character. His pupil Alonzo Cano (1601-67) continued this style in works of an ascetic religious character. In the eighteenth century mannerism reigned supreme.

England depended almost entirely upon importation during this period, of Netherlanders during the fifteenth century, and of Italians during the sixteenth. It remained barren soil during the two following centuries as well, the only names of note being Nicholas Stone, who was associated with the architect Inigo Jones, and Grinling Gibbons (d. 1721), a Dutchman associated with Christopher Wren. Flaxman belongs to the following epoch.

MODERN SCULPTURE.

The reaction upon the extravagancies in form and feeling of Baroque sculpture took the form of a return to classical simplicity. The antique was followed more closely than ever before, as well in subject as in form. Sculpture lost its religious character and became private and aristocratic. With the increasing prominence of national and democratic movements, a demand for a more natural art arose. Finally, in the latter half of the nineteenth century, sculpture began to occupy itself with the actualities of life. The earliest leader of the classical reaction was Antonio Canova (1757-1822), whose life work was done at Rome, where he came under the influence of the movement originated by Winckelmann. His earliest works were in the Baroque, the spirit of which is still evident in his statuary of a classical character, and his art represents the transition from the Baroque to the more purely classical spirit of Bertel Thorwaldsen (1770-1844). A Dane by birth, but a Roman by adoption, the latter became the greatest representative of the classic in modern art. As Canova had excelled in statuary, so he in relief, using the purest Greek work as his models, and producing the highest class of work possible to one expressing himself in the dead forms of a past epoch. From Rome the influence of these men radiated throughout Europe, transforming sculpture.

France. The chief representatives of the classical school in France were Antoine Denis Chaudet (d. 1810), whose best works were of an ideal character, and François Joseph Bosio (d. 1845) and James Pradier (1792-1852), who attained a higher technical perfection by a tendency toward sensuous treatment. Some of Pradier's many pupils manifested within their classical forms a tendency toward naturalism.

Corresponding with the Romantic reaction in painting there came a similar tendency in sculp-

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ture, which found its inspiration in the Middle Ages, from which its subjects were largely drawn. Its chief representative was Préault (1809-79), but neither he nor his followers made technical improvements on the classicists. A more important form of the reaction was naturalism, which found its chief early representative in David d'Angers (1780-1856), whose works are a transition from classicism to modern realism. His portrait statues and busts are often not only characteristic, but absolutely realistic. The most prominent figure during the first half of the nineteenth century was François Rude (1784-1855), who also began as a classicist, but soon yielded to an innate naturalism. His "Departure of the Volunteers in 1795" on the Arch of Triumph in Paris was epoch-making in modern sculpture. The same naturalism was applied to the representation of wild animals, the savage strength and character of which was presented with great force by Antoine Louis Barye (1795-1875), and by his pupil Auguste Nicolas Cain (1822-94), who portrayed, though with less ability, the greater pachyderms.

Classical and naturalistic tendencies run parallel in the second half of the nineteenth century with an increasing influence of naturalism. Among the more strictly classical are men like Henri Chapu (1833-91), who worked freely in the Greek spirit, Dumont, Jouffroy, and Perraud. In academic circles the romantic and naturalistic tendencies have gained great ground, so much so that the Renaissance rather than antiquity may be considered the source of inspiration in the well-balanced and technically faultless compositions of men like Paul Dubois (1829—). Other important representatives are the clever and versatile Falguière (1831-1900); Antonin Mercié (1845—), whose art is graceful and refined; the fantastic but more highly individual Saint Marceaux (1845—); Bartholdi (1834—), sculptor of the Liberty Statue in New York Harbor; and Louis Ernest Barrias (1841—), whose work is characterized by largeness of treatment.

Jean Baptiste Carpeaux (1827-75), a pupil of Rude, carried his master's naturalism to its logical conclusion in work characterized by great abandon and dramatic power and by a sensuality reminding of Rubens. Emmanuel Frémiet (1824) combined the art of his uncle Rude with that of Barye, being equally successful as an animal and figure sculptor. His works are mostly fine equestrian monuments and genre subjects. Perhaps the greatest works of all have been produced by the later naturalists, who since the misfortunes of 1870, which seem to have had a disciplinary effect upon French art and life, have executed works of the highest order. The two chief leaders were Jules Dalou (1838—) and Auguste Rodin (1840—), who headed the sculptors in the secession of 1890, when, joining with the painters, they formed the salon of Champs de Mars. The former is a realist on the order of Carpeaux, refined by academic training, who endeavors to maintain an historical continuity with French art of the time of Louis XIV. Rodin is probably the greatest sculptor of the century. Scorning all traditions and following nature alone, without regard to elegance of form, he has produced dignified though melancholy statues, which will bear comparison with the best work of all times. A very remark-

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cent years are Harry Bates (1850-99), George Franklin (1860—), a decorative sculptor, the animal sculptors Robert Stark and John Swan, and Frederick Pomeroy, who has made fine statuettes.

GERMANY. The first German classicist of importance was Johann Heinrich Dannecker (1758-1841), who established the Stuttgart school. In Berlin, Johann Gottfried Schadow (1764-1850), although a classicist, and superior where the ideal element was involved, began the introduction of historical sculpture. His principal followers were his son Rudolf Schadow (d. 1822), Christian Friedrich Tieck (1776-1851), and Christian Rauch (1777-1857), the greatest sculptor of the German historical school. Though his sense of form was refined by the antique, Rauch's art was in the main naturalistic, and faithful to historical detail. In a series of fine monumental sculptures he succeeded in the rendition of modern costume. Among his followers were Drake, Bläser, Schievelbein, Kiss, famous for his animals in bronze, Siemering, Encke, and Schweinitz. The tendency of the Berlin school was toward historical and naturalistic sculpture. At Dresden, Ernst Rietschel (1804-61), the best of Rauch's pupils, continued his master's style, with a slight tinge of Romanticism. Ernst Hähnel (1811-91) represents rather the transition from classical to romantic style, while Johannes Schilling (1828—), Rietschel's most distinguished pupil, shows a tendency toward the Rococo in such works as the National Monument in the Niederwald.

At Munich the tendency was toward Romanticism, modified by the classic style. Konrad Eberhard (1768-1859) executed a large number of mediæval subjects. Ludwig Schwanthaler (1802-48), notwithstanding his training under Thorwaldsen, was best in the treatment of national subjects of a romantic character. Not until the end of the nineteenth century did the naturalistic tendency definitely triumph, especially at Berlin in the work of Reinhold Begas (1831—), whose masterpiece is the memorial to William I. (unveiled 1897), and in that of Karl Begas, Eberlein, Geiger, Schott, and others. Much more pronounced is the naturalism, in their sculptural efforts, of the painters Franz Stuck, in Munich, and Max Klinger, at Leipzig, where also Karl Seffner is conspicuous as a realistic portrayer. In Vienna the modern period was ushered in by Fernkorn (1813-78), of Schwanthaler's school, and counts among its chief representatives Zumbusch (1830—), Kundmann (1838—), Weyr (1847—), and, pronouncedly naturalistic, Viktor Tilgner (1844-96). Arthur Strasser (1854—) is especially noted for his polychrome statuary. Among the German sculptors who settled in foreign parts, the most distinguished are Emil Wolff (1802-79) in Rome, and Adolf Hildebrand (1847—) in Florence.

OTHER EUROPEAN COUNTRIES. In Italy the classical tendency has been stronger than elsewhere in Europe, and the ultimate triumph of realism has therefore been more retarded. The chief pupil of Canova was Pietro Tenerani (1789-1858), afterwards an ardent follower of Thorwaldsen; Pompeo Marchesi (1789-1858) is known for his colossal statues. The Italian romanticists tried to unite naturalistic with classical tendencies, as may be seen in the works of Bartolini (d. 1850), Pampaloni (d. 1847), and Pio Fedi (1815-92). Far more naturalistic, though still classical, compared with other contemporary European sculptors, were Giovanni Dupré (1817-82), Vicenzo Vela (1822-91), and Giulio Monteverde (1837—). The most important sculptor of the present day is Ettore Ximenes, who has executed a large number of monumental works of importance.

The Scandinavian countries followed the general European development, the Renaissance finding entrance later than elsewhere in Europe. The influences were at first Netherlandish, but during the eighteenth century French masters were mostly employed. In Sergel (1740-1814), Sweden possessed a classicist whose works are said to bear favorable comparison with those of Thorwaldsen. Byström (1783-1848) and Fogelberg (1786-1854) followed in his wake. Sergel's pupils and those of Thorwaldsen in Denmark early tended toward romantic subjects from Norse mythology. Most akin to Thorwaldsen's art was that of Bissen (1798-1868). At present the general tendency in these countries is naturalistic, after French models, and its most prominent exponent is the Norwegian Stefan Sinding (1846—). A strong naturalism, combined with sharp characterization, is also the principal trait of Russian sculpture, which is of very recent growth. The best known artists are Lanceray, whose bronzes are full of spirited action combined with detailed execution, and Lieberich (1828—), a sculptor of animals.

UNITED STATES. Neither distinguished foreigners like the Italian Cerachi and the Frenchman Houdon, who came to America during the eighteenth century, nor self-taught Americans like William Rush (1757-1853), of Philadelphia, and John Frazee (1790-1852), had any influence on the development of American sculpture. The first artists of prominence belong to the school of Canova and Thorwaldsen. The first to go to Rome was Horatio Greenough (1805-52), who executed portrait statues, like Washington as the Olympian Zeus, in classical garb, and a number of refined busts. Hiram Powers (1805-73), whose "Greek Slave" is well known, was a conscientious artist. Thomas Crawford (1813-57) was more original, mingling the classical spirit with American sentiment. Erastus Dow Palmer (1817—), William Wetmore Story (1819-96), and Randolph Rogers (1825-92) were less important representatives of the same group. John Rogers (1829—) appealed to sentiment and everyday incident by statuette groups of military and domestic subjects. The most able of the later American classicists were William Henry Rinehart (1825-74), who did both ideal works and public monuments in a pure dignified style, and Harriet Hosmer (1830—), the favorite pupil of the English sculptor Gibson. Only two prominent sculptors of the early period were distinctly national in spirit. Henry Kirke Brown (1814-86) executed public monuments with a vigorous style, and his pupil J. Q. A. Ward (1830—) is widely known for his statues and statuettes of Indians and negroes. Ward's remarkable gifts of composition and form have raised him to the highest rank among American artists.

Since about the time of the Centennial Exposition (1876) classicism has ceased to influence American art. A number of sculptors like Ephraim Keyser (1850—), of Baltimore, have had German training, while others have remained

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in Italy, but by far the most important influence has come from Paris. Howard Roberts (1845—) was the first to show French influence; Olin Levi Warner (1844-96), a pupil of the Ecole des Beaux-Arts, had executed strong characteristic busts and portrait statues, as well as work in higher relief, when his life was terminated by an accident. Augustus Saint Gaudens (1848—) has gained remarkable fame from the decorative and illustrative character of his work. Daniel Chester French (1850—), whose training is chiefly American, is a master of sentiment treated in sculpture with infallible good taste and in remarkably pure forms. More thoroughly Parisian is Frederick MacMonnies (1863—), a pupil of Saint Gaudens, who in a nervous, highly modern style has executed a number of statues of good taste and powerful realism. Herbert Adams, although modern and realistic, has found inspiration in the Florentine Renaissance, with the best products of which his works bear favorable comparison.

Besides these artists mention should be made of William Ordway Partridge; Paul Bartlett, the author of the Lafayette statue in Paris; Karl Bitter, who has designed much architectural sculpture for great buildings; Charles H. Niehaus, a master of modeling; J. Massey Rhind, who had done good decorative work; A. P. Proctor, the sculptor of Indian life; Edward Kemys, who has portrayed in an admirable manner American native animals. Among younger sculptors George Gray Barnard has recently attracted attention by his difficult and ambitious projects.

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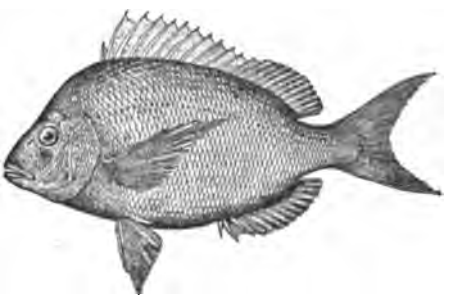
SCULPTURE SOCIETY, NATIONAL. A society formed in New York in 1893 to foster the taste for, and encourage the production of, ideal sculpture for the household and museum; to promote the decoration of public buildings, squares, and parks with sculpture of a high class; to improve the quality of the sculptor's art as applied to industries; and to provide from time to time for exhibitions of sculpture and objects of industrial art into which sculpture enters. There are two classes of members—sculptors and non-sculptors. The number of members in 1903 was about 80 of the former class, and about 250 of the second.

SCUP (contracted from North American Indian *mishcup*, from *mishe-kuppe*, large-scaled, thick-scaled), SCUPPAUG, or PORGY. A fish (*Stenotomus chrysops*) of the family Sparidæ (q.v.) resembling the sheepshead (q.v.), very abundant off the eastern coast of the United States south of Cape Cod, and highly valued as a toothsome food-fish. It is brown,



THE SCUP.

with bright reflections, and about a foot in length. It approaches the coast to spawn among the eel grass in early summer, and feeds mainly upon mollusks, sand-worms, and other animal matter. This habit makes it exceedingly useful as a scavenger, and it congregates near fertilizer factories and similar places where offal is thrown into the sea. It is especially liked in Southern markets, where it is called porgy, as also is a Southern congener (*Stenotomus aculeatus*). Compare PORGY. Consult Goode, *Fishery Industries*, sec. i. (Washington, 1884).

SCURVY (variant of *scurfy*, from *scurf*, AS. *scurf*, *sceorf*, OHG. *scorf*, Ger. *Schurf*, scurf, from AS. *sceorfan*, OHG. *scurfan*, Ger. *schürfen*, to gnaw, scratch), or SCORBUTUS. A constitutional disease, characterized by profound alterations in the blood resulting in hemorrhages beneath the skin, mucous membranes, and in other parts of the body, and by a spongy condition of the gums, anæmia, and great weakness. It is induced chiefly by the deprivation of fresh vegetable food, and is not contagious. From the earliest times until the beginning of the nineteenth century scurvy had been the scourge of sailors. The cause was the exclusive diet then prevalent aboard ship of salt meat and hard bread, with a deficient and impure supply of drinking water, upon which

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tury sea scurvy has become comparatively rare. The shorter voyages of modern times, owing to the introduction of steam, and the compulsory carrying of fresh meat, vegetables, and lemon or lime juice, have made the disease almost unknown at sea, although it is still found on land among garrisons and in prisons, in starving, isolated communities, and among improperly fed infants.

Scurvy generally comes on slowly, with loss of color, weakness and apathy, and pains in the back and limbs. In a week or more small hemorrhages (petechiæ) occur under the skin in various parts of the body. The spots are small, red or reddish brown, some of them resembling bruises. Later there may be seen large extravasations of blood into the eyelids, and tense brawny swellings will be found at the bend of the elbows or knees, in front of the tibia, and under the angle of the jaw, due to the effusion of blood or serum into or between the soft tissues and the bones. The gums become swollen, spongy, ulcerated, and bleed at the slightest touch. The teeth may loosen or even fall out. It is a curious fact that in toothless infants and elderly persons the gums are but little affected. When the disease has lasted for some time the patient has a sallow, bloated look, is short of breath, subject to fainting spells, and quite unable to exert himself mentally or physically. Nose-bleed and swelling of the feet often occur. An affection of the vision known as *hemeralopia* may be an early symptom. This consists of entire blindness in the dusk or darkness, without interference with the sight during the day. Death takes place after several weeks from exhaustion or hemorrhage unless suitable treatment is instituted.

Children from six months to two years old are sometimes attacked with scorbutus (*infantile scurvy* or Barlow's disease), the essential lesion of which is a subperiosteal hemorrhage, which causes thickening and tenderness along the shafts of the bones. It occurs as a result of exclusive feeding with condensed milk, the various prepared infant's foods, or sterilized milk. The disease is often associated with rickets, and is characterized by an earthy pallor, spongy and bleeding gums, after dentition, and the swelling of the limbs referred to above.

Treatment depends on the use of an abundance of fresh vegetable food, such as onions, mashed potatoes, cabbage, lettuce, and spinach, with fresh meat, and the administration of lime, lemon, or orange juice in doses of three or four ounces daily. In infants the orange juice and the restoration of a diet suitable to the age will be sufficient. When the mouth is sore and mastication is impossible, milk, beef tea, broth, and eggs may be given. For the prevention of scurvy in time of war, or on shipboard or in places where fresh food is scarce, canned vegetables will take the place of fresh to a great extent. In addition to these, an ounce of lemon juice daily, or the addition of the malates, citrates, tartrates, and lactates of potassium to the food or drink will be found efficient preventives. The law requires merchant ships to serve lime juice to each man daily after ten days at sea. This is mixed with a small percentage of brandy, whisky, or other liquor.

of the natural order Cruciferæ with an acrid biting taste, due to the pungent volatile oil characteristic of horse-radish. Common scurvy-grass (*Cochlearia officinalis*), which is sometimes a foot high, is a very variable, widely distributed plant in rocky and muddy places, on high mountains, in Arctic regions, and on seashores throughout the world. It was formerly valued by sailors as a preventive of or remedy for scurvy.

SCUTAGE, or **ESCUAGE** (Lat. *scutum*, shield). A pecuniary tax sometimes levied by the Crown, in feudal times, as a substitute for the personal service of the vassal.

SCUTARI, skōō′tä-rē (Turk. *Ishkodra*). A town of Albania, the capital of the Turkish Vilayet of Scutari, situated at the southern end of the Lake of Scutari, 12 miles from the Adriatic (Map: Balkan Peninsula, B 3). It is a fortified town dominated by a citadel. It has some manufactories, a bazaar, and yards for building coasting vessels. There is an export trade in skins, woolens, sumach, and grain. Scutari, the ancient Scodra, fell into the hands of the Romans in B. C. 168. At the close of the Middle Ages it was in the hands of the Venetians. In 1477 it withstood an eight months' siege by the Sultan Mohammed II., but two years later was ceded to the Porte. Population, about 36,000.

SCUTARI (Turk. *Usküdar*). A town of Asia Minor, on the eastern shore of the Bosporus, opposite Constantinople, of which it is a suburb (Map: Turkey in Asia, C 2). It contains several mosques, bazaars, baths, colleges, and schools. There are manufactures of silks, cotton fabrics, and leather. Scutari is the rendezvous and starting point of caravans trading with the interior of Asia. It has long been famed for its extensive cemeteries, adorned with magnificent cypresses, the chosen resting-place of many of the Turks of Constantinople. The town acquired notoriety during the Russian War (1853-56), when the enormous barracks built by Sultan Mahmud were occupied by the English troops, and formed the scene of Lady Nightingale's labors. Scutari occupies the site of the ancient Chrysopolis. About two miles to the south lies the village of Kadiköi, the ancient Chalcedon. Population, estimated at 80,000.

SCYLAX, sī′läks (Lat., from Gk. Σκύλαξ, *Skylax*). A Greek geographer of the sixth century B.C. Herodotus (4, 44) says that he was sent by Darius Hystaspis, probably about B.C. 508, to explore the lower course of the Indus, and then sailed west through the Indian Ocean and the Red Sea, completing the voyage in thirty months. The *Periplus* now extant and bearing the name of Scylax (edited by Fabricius, 1883) is almost certainly of the fourth century B.C.

SCYLLA (sĭl′lä) **AND CHARYBDIS,** kä-rĭb′-dĭs (Lat., from Gk. Σκύλλα, *Skylla*, and Χάρυβδις, *Charybdis*). Two sea monsters described in the *Odyssey* (xii. 73 ff.), personifications of the dangers of navigation near rocks and eddies. Scylla is described as dwelling in a cave in a precipitous cliff, a monster with twelve feet, and six long necks, each bearing a head with three rows of teeth. With these she devours any prey that comes within reach, and snatches six men from

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the ship of Odysseus. Opposite her, a bowshot's distance, is a low rock, where under a wild fig-tree Charybdis sucks in and belches forth the water three times daily, and nothing that comes near can escape. This dangerous passage, where it was impossible to avoid both dangers, was early localized by Greek travelers at the Straits of Messina. In Homer Scylla's mother is called Cratais, but later legend told many stories about her, which in general relate that she was a beautiful maiden, beloved by a god (as Glaucus or Poseidon) and transformed by a jealous rival, Circe or Amphitrite. The Greeks of the Saronic Gulf told how Scylla, daughter of Nisus, King of Megara, won by her love or a bribe, betrayed her father to Minos of Crete. Minos, however, disgusted by her unnatural treachery, dragged her at his rudder until she was transformed into the monster or the sea-bird Ciris, which is always pursued by the sea-eagle into which Nisus had been changed.

SCYLLIS, sĭl'lĭs (Lat., from Gk. Σκύλλις, *Skyllis*). An early Greek sculptor whose name is associated with that of Dipœnus. See DIPŒNUS AND SCYLLIS.

SCYPHOZOA, sī'fō-zō'ȧ (Neo-Lat. nom. pl., from Gk. σκύφος, *skyphos*, cup + ζῷον, *zōon*, animal). A class of Cœlenterata (q.v.) characterized by the scyphistoma or polyp-like early stage. See MEDUSA.

SCYROS, sī'rŏs. An island in the Ægean Sea, the largest of the northern Sporades, 25 miles northeast of Cape Kumi, Eubœa (Map: Greece, F 3). Length, 19 miles; area, 77 square miles. Skyros is mountainous and uncultivated in the south, but the northern part has fertile plains which produce excellent wheat. The principal industries are vine growing and the raising of sheep and goats. The only town on the island is Skyros, built on a high peak on the eastern coast, the broad summit of which is occupied by the ruins of a castle, and was the site of 'the lofty Scyros' of Homer. The island is connected with the Homeric legends of Theseus and Achilles. Population, in 1896, 3512.

SCYTHIA, sĭth'ĭ-ȧ (Lat., from Gk. Σκυθία, *Skythia*). According to the ancient Greeks, a vast, undefined region, lying north and east of the Black and Caspian seas, and inhabited by a large number of barbarous nomadic tribes; though in a more restricted sense the Scythians are identified with the Scoloti, who inhabited the plains of Southeastern Europe. These tribes have been thought to be of Mongolian origin, but the prevalent modern opinion is that they belonged to the Indo-European family. They are frequently mentioned by Herodotus (see especially book iv.) and other Greek writers, and are described as herdsmen without settled abodes, living like Gypsies in tent-covered wagons, cruel in war and filthy in their habits. In the seventh century B.C. they invaded Media and were driven off by Cyaxares only after a ten years' struggle. Darius invaded their country about B.C. 508, but retreated after heavy losses from attacks and from the hardships of the trackless country. The Scythians of Europe were finally overcome and exterminated or assimilated by the Sarmatians, who afterwards occupied their country. In the farther East, however, the Scythian tribes maintained themselves, and invaded Parthia and India, where their leaders adopted Buddhism and established dynasties that lasted for centuries. To the Romans, *Scythia* meant the little-known wastes of Northern Asia, from the river Volga to India and China. Consult: Neumann, *Die Hellenen im Skythenlande* (Berlin, 1855); Reichardt, *Landeskunde von Skythien* (Halle, 1889); Krause, *Tuisko-Land* (Glogau, 1891); Latyshtchev, *Scythica et Caucasica* (Saint Petersburg, 1893).

SCYTHOP'OLIS (Lat., from Gk. Σκυθόπολις, *Skythopolis*). The classical name of a town of Palestine, the biblical Beth-shean or Beth-shan, the modern Beisan, about 15 miles south of the Sea of Galilee and 3 miles west of the Jordan. Although assigned to the tribe of Manasseh (Josh. xvii. 11, 16), the original Canaanites kept possession of it (Jud. i. 27), and it is not until the days of Solomon that we find it in the hands of the Hebrews (I. Kings iv. 12). When Saul and his sons fell in the battle of Gilboa, the Philistines fastened their bodies to the wall of Beth-shean, whence the men of Jabesh-Gilead afterwards removed them (I. Sam. xxxi. 10-13; II. Sam. xxi. 12). Beth-shean was called Scythopolis in the third century B.C., at which time it was tributary to the Ptolemies. It belonged to the Decapolis. It was the seat of a Christian bishopric in the fourth century. There are extensive ruins in the neighborhood of the modern town.

SEA. See OCEAN.

SEA, LAWS OF THE. See MARITIME LAW; NAVIGATION LAWS.

SEA-ADDER. The fifteen-spined stickleback (q.v.).

SEA-ANEMONE. The name applied to polyps or zoöphytes (Actinozoa) which do not secrete a coral-stock, and resemble flowers, especially those of the mesembryanthemum. They are also called actinians. They are practically stationary, though they can slowly move over the surface of the rock to which they are attached. They are in general as broad as high, and more or less vase-like, the mouth being surrounded by one or more circles of tentacles. They may attain a diameter of several inches, though few are ever more than three inches across. The common actinian of our coast (*Actinobola marginata*) is to be found between tide-marks on rocks under seaweed, in tidal pools, but grows most luxuriantly on the piles of wharves and bridges. In the tentacles are lodged the lasso-cells, or nematocysts (q.v.), by which it obtains its prey. When a passing shrimp or small fish comes in contact with certain tentacles, the barbed thread is thrown out from the lasso-cell; these paralyze the victim, and the other tentacles assist in dragging it into the distensible mouth, where it is partly digested, the process being completed in the second or lower division of the digestive canal. At the base of certain tentacles are the eye-specks. The process of taking food is almost purely reflex.

Nearly all actinians multiply by budding, as well as by eggs. The new individuals arise at the base of the body, sometimes as many as twenty young ones growing out from the base, and finally becoming free. Adult sea-anemones in rare cases subdivide longitudinally. (See SCHIZOGONY.) The young grow up without any

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metamorphosis. In most actinians the digestive sac forms a blind pouch, but in Cerianthus, which lives in deep water, buried in the mud or fine sand, where it secretes a leathery tube, the stomach or intestine opens out at the end of the body. The young of the European Cerianthus, as also of Edwardsia, unlike those of other actinians, lives at the surface, being free-swimming. Consult: Gosse, *The Aquarium* (London, 1854); *British Sea-Anemones and Corals* (ib., 1858); E. C. and A. Agassiz, *Seaside Studies in Natural History* (Boston, 1871); Arnold, *The Sea Beach at Low Tide* (New York, 1900).

SEA-BASS. A large family (Serranidæ) of marine, perch-like fishes, abounding in all warm seas and in some fresh waters. They remain as a rule in comparatively deep water, except when they approach the shore for spawning in the early summer; are carnivorous, feeding near the bottom; are powerful swimmers and leapers; are often very handsomely colored and marked; and are excellent food. Some have commercial importance (see FISHERIES), while others are prominent among game fishes. About 60 genera and 400 species are recognized in the family as now delineated. (For classification, see Jordan and Eigenmann, *Bulletin* viii., United States Fish Commission, Washington, 1888; and Boulenger, *Catalogue of Teleostean Fishes in the British Museum*, vol. i., London, 1895). A typical species and the one best known under this name in the United States is the black sea-bass (*Centropristes striatus*), illustrated in the Colored Plate of FOOD-FISHES, with the article FISH AS FOOD. It is about 18 inches long and three pounds in weight, and is dusky brown or black, more or less mottled, and with pale longitudinal streaks. It is numerous along the Atlantic coast from Cape Ann to Florida, and is one of the most highly esteemed fishes for the table. Local names for it are 'blackfish,' 'black Harry,' 'hannahill,' and 'tallywag.' This species is of special interest to fish-culturists as the one with which Mather, in 1874, first succeeded in producing artificial fertilization, and demonstrated the practicability of modern methods.

Other prominent marine Serranidæ in America are the jew-fishes, nigger-fishes, groupers, hinds, guasas, scamps, squirrel-fishes, and yellowtails. The typical genus Serranus is represented in Europe and in Eastern waters by familiar and useful species frequently called sea-perches, of which a very handsome Eastern one (*Serranus marginalis*) is well known on Japanese and Philippine coasts. See Colored Plate of FISHES OF THE PHILIPPINES. Consult general works on ichthyology (see FISH); and for American forms especially the writings of Goode, Bean, and Jordan.

SEA-BREAM. A British name for several fishes of the family Sparidæ (q.v.), especially a common and useful species (*Pagellus centrodontes*) of the European coast. The name is sometimes given to the American 'sailor's choice' (*Lagadon rhomboides*). See BREAM.

SEA'BRIGHT. A borough in Monmouth County, N. J., 27 miles south of New York City; on the Central Railroad of New Jersey (Map: New Jersey, E 3). It is chiefly important as a residential place and as a summer resort. It dates from 1860. Population, in 1900, 1,198.

SEA'BURY, SAMUEL (1729-96). The first bishop of the Episcopal Church in America. He was born at Groton, Conn., graduated at Yale in 1748, and later studied medicine and theology at Edinburgh. He was ordained deacon and priest at the end of 1753, and returned to America five months later, engaging in pastoral work first at New Brunswick, N. J., then at Jamaica, L. I. (1757-66), and at Westchester, N. Y. (1766-75). He was obliged to resign his parish owing to his loyalist or Tory sentiments, which he advocated in able pamphlets, suffering imprisonment and practical exile for his convictions. In March, 1783, he was elected bishop by the fourteen Episcopal clergymen then resident in Connecticut, and went to London to seek consecration from the English prelates. But various difficulties, chiefly political, stood in the way of their action; and, after waiting more than a year, he made the same request of the bishops of the Episcopal Church in Scotland. They, unhampered by any connection with the State, were willing to act, and Seabury was accordingly consecrated on November 14, 1784, by the Bishops of Aberdeen and Moray and Ross, and the Coadjutor Bishop of Aberdeen. He returned to America the following summer, and was more or less formally recognized as in charge not only of Connecticut, but of all New England. The validity of his consecration was, however, denied by some in the Middle and Southern States; and the question was not finally set at rest until the General Convention of 1789 formally declared in favor of it by a unanimous vote. He died at New London, Conn. Consult Beardsley, *Life and Correspondence of Samuel Seabury* (Boston, 1881), and the authorities referred to under EPISCOPAL CHURCH.

SEABURY, SAMUEL (1801-72). A Protestant Episcopal clergyman, grandson of Bishop Samuel Seabury. He was born at New London, Conn.; was ordained priest in the Protestant Episcopal Church in 1828; was editor of *The Churchman*, 1831-49; rector in New York City, 1838-68; and professor of biblical learning in the General Theological Seminary, 1862-72. He published: *The Continuity of the Church of England in the Sixteenth Century* (1853); *Supremacy and Obligation of Conscience* (1860); *American Slavery Justified* (1861); *The Theory and Use of the Church Calendar* (1872); *Discourses on the Holy Spirit* (edited by his son, with memoir) (1874).

SEA-BUTTERFLY. A pteropod mollusk (*Clione papilionacea*), a beautiful and rather large flesh-pink form, common in the Arctic seas, where it forms the food of the baleen whale, and is called by the whalers 'brit.' It has been observed on the Labrador coast rising and sinking in the water among the cakes of floe-ice, and is said to have been detected as far south as New York. It is an inch long, the body fleshy, not protected by a shell, the 'wings' being rather small.

SEA-CLAM. A large bivalve of the northeastern Atlantic coast (*Mactra solidissima*); it inhabits rather deep water, but is often cast ashore in large quantities, and is useful as bait.

SEACOAST ARTILLERY. See COAST ARTILLERY; ORDNANCE.

SEA-COW. A huge, herbivorous, aquatic mammal of the order Sirenia (q.v.). The name

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1 HELIACTI
2 MESACMA
3 AIPTASI
4 CYLISTA
5 BUNODE

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applies specifically to the extinct rytina or Arctic sea-cow (*Rhytina Stelleri*), which once frequented Bering Straits, but was exterminated about 1767 by seal-hunters and sailors who found its beef-like flesh excellent eating. When discovered by Bering's expedition in 1741, it lived only on Bering and Copper Islands. G. W. Steller, the naturalist of the expedition, made sketches and wrote an account of the animal, which he describes as 24 to 30 feet long, with a girth of 19 or 20 feet and weighing about 8000 pounds. The head was small, and the jaws had, instead of teeth, horny pads similar to those in the mouth of the dugong. The skin was very thick, dark-colored, and rough. The rytina was gregarious, and dwelt in herds about the mouths of streams, where it lived on seaweeds. It was unable to dive, and hence was restricted to shallow water, where its feeding was often prevented by ice, so that in winter many starved. It was stupid, sluggish, and comparatively helpless. Stejneger's writings in the *Proceedings* of the United States National Museum, vol. vii. (1884), and in *The American Naturalist*, vol. xxi. (1887), contain most of what is known of this extinct race. Consult also Nordenskjöld, *Voyage of the Vega* (New York, 1881).

SEA-CUCUMBER. A holothurian (q.v.). The name, which refers to the shape, is appropriate only for certain of the pedate species, most of the footless forms being more or less elongated and worm-like. Compare TREPANG.

SEA-DEVIL. A devil-fish; especially the great ray (*Manta birostris*).

SEA-EAGLE. See EAGLE.

SEA-ELEPHANT. See ELEPHANT-SEAL; and Colored Plate of SEALS.

SEA-FAN. An alcyonarian (q.v.) coral, in which the form of the colony is not unlike that of a fan, being very greatly flattened, so that it becomes wide and high but very thin. Moreover, it is not solid, but consists of an open network, with the meshes of comparatively small size. The forms to which the name is most popularly given are species of Gorgonia, and especially the common West Indian species, *Gorgonia flabellum*. Fine specimens are sometimes four feet high and nearly as far across. The color is very variable, but is usually yellow or dull reddish purple. Sea-fans are sparingly represented in a fossil state; only a few forms are known from Cretaceous and Tertiary rocks. See GORGONIACEA.

SEAHAM (sē'am) **HARBOR.** A seaport in the County of Durham, England, 5 miles south of Sunderland (Map: England, E 2). It has a finely equipped harbor, a seaman's infirmary, and the Londonderry Literary Institute. Bottle works, blast furnaces, an iron foundry, and chemical works are its principal industrial establishments. The chief article of export is coal. Seaham was founded in 1828 by the Marquis of Londonderry. Population, in 1901, 10,200.

SEA-HOLLY. See ERYNGO.

SEA-HORSE. One of the small strange syngnathous fishes of the pipefish family, which constitute the genus Hippocampus and its near allies, and take their name from the rude resemblance of the head to that of a horse. The body is compressed, with an elongated tail, and the integument is a series of large, rectangular bony plates, with a series of spines and projections along the lines of juncture. These spines, together with the divided, streamer-like fins of some species, give them a strong resemblance to the seaweeds among which they live. There are about 20 species in various warm and temperate seas. All keep near shore, often developing in brackish water; and as their powers of swimming are feeble, they have become able, by the development of prehensility in the tail, to cling firmly to weeds and other supports and so resist being swept away. Like the pipefishes (q.v.), the males take charge of the eggs, which are placed in an abdominal pouch, and remain there until they hatch; and for some time afterwards the fry will, when alarmed, return to the shelter of the pouch. Consult Gunther, *Introduction to the Study of Fishes* (London, 1880).

A SEA-HORSE.

SEA ISLANDS. A group of low sandy or marshy islands on the coast of South Carolina between Charleston and Savannah. They are separated from the mainland by a series of lagoons, sounds, and narrow, tortuous channels. Their soil is especially well adapted for rice and cotton, the latter, for which the islands are celebrated, being a fine, long-stapled variety.

SEA-KALE, or CRAMBE (*Crambe maritima*). A perennial plant of the natural order Cruciferæ native to European seacoasts. Its blanched sprouts are eaten like asparagus. Sea-kale is especially popular in England, but is grown to a limited extent elsewhere. Sea-kale is generally propagated by offsets or cuttings of the roots, and sometimes by seed. A plantation remains productive for several years.

SEAL (OF. *seel*, *scel*, Fr. *sceau*, from Lat. *sigillum*, seal, mark, diminutive of *signum*, sign, mark, token). By ancient common law a seal must consist of a piece of wax, lead, or other tenacious metal or substance, stamped with words or a device, according to the fancy of the person adopting it. At present two of the most common devices are: a circular bit of paper stamped in some manner and attached to the instrument by mucilage; the impress of a design or words in the paper of the instrument itself by means of a die.

Introduced at a time when practically only the clergy could write, and used for a long time instead of signatures on private writings, etc., as well as legal instruments, seals did not originally invest an instrument with any distinctive solemnity, but after the art of writing became a common accomplishment and most private writings, not of a legal nature, were signed instead of sealed, the courts began to attach a peculiar and

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arbitrary efficacy to a sealed legal instrument as distinguished from one bearing merely a signature. After feoffment as a means of transfer of land was abolished, all conveyances were required to be under seal. The most important effect ascribed to the use of a seal was that it conclusively imported consideration for a promise or obligation contained in a sealed instrument.

However, to-day in the United States the matters of the necessity for a seal on various instruments and the kind of a seal required when necessary are almost wholly regulated by statutes. In New York and Connecticut the word 'seal' or the Latin abbreviation 'L.S.,' written on the instrument, are recognized as sufficient substitutes for seals; and in Arkansas, California, Florida, Illinois, Indiana, Maryland, Michigan, Missouri, New Mexico, North Carolina, Oregon, Pennsylvania, South Carolina, Virginia, and West Virginia, a scroll executed with a pen will be sufficient. In New Jersey, Minnesota, Wisconsin, and Wyoming any device or flourish with the pen will be recognized as a seal if intended as such.

In the following States the common-law distinction between sealed and unsealed instruments has been abolished by statutes: Arkansas, California, North Dakota, South Dakota, Mississippi, Indiana, Kentucky, and Tennessee.

It is not necessary for individuals to use seals in Arizona, Colorado, Idaho, Iowa, Kansas, Nebraska, Nevada, Ohio, Utah, and Washington. Most States, however, require a seal on instruments executed by corporations. Public officers are usually required to have official seals and all important public documents must be impressed with the proper seal.

The courts will usually recognize without proof the seals of nations and of the various States of the United States, the seals of superior courts and of public officers within their own State, including notarial seals. See CONTRACT; CONSIDERATION; NOTARY PUBLIC, and consult "History and Use of Seals in England," in vol. xviii. of *Archæologia* (London); Blackstone, *Commentaries;* Parsons, *On Contracts.*

SEAL (AS. *seol, siol,* OHG. *selah, selach,* seal). A carnivorous aquatic mammal of the suborder Pinnipedia, without tusk-like canines in the upper jaw; any pinniped except the walrus. Seals are specially modified for their aquatic life, particularly in the structure of the limbs. The upper arm and forearm of the front limb, and the two corresponding parts of the hind limb, are very short and more or less imbedded in the tissues of the body, while the hands and feet, especially the latter, are greatly enlarged and fully webbed. Five well-developed digits are present in all cases, but in the hind limbs the outer and inner digits are stouter and often longer than the other three. There are no clavicles in the shoulder girdle, and the limbs are poorly adapted for use on land. The tail is always very short, but the hind limbs often serve the purpose of a rudder. The body is sleek and graceful, tapering posteriorly as in cetaceans (q.v.), but the head is always distinct and well formed. The whole surface of the animal develops a hairy covering, even the palms of the hands and soles of the feet being thus protected in the true seals. There are always fewer than twelve incisor teeth, and usually four premolars and only one molar are present on each side of the head, in each jaw. The brain is large and much convoluted, and seals exhibit much intelligence. The eyes are large and exposed, with flat corneas, and external ears, though small, are often present.

Although so specially adapted to their aquatic life, seals come to shore or upon ice-floes to mate and to bring forth their young. One or two young are produced at a time, not oftener than once a year. Seals are polygamous and the males fight savagely for the possession of the females. As the pairing occurs soon after the birth of the young, the latter, known as 'pups,' are often neglected and many die. During the breeding season the males do not eat, and it is said they sometimes endure three months of abstinence. The food consists of various marine animals, chiefly fish, squids, and crustaceans; possibly vegetable food is also used at times. It is a curious fact that seals often swallow pebbles and even large stones, which are frequently found in their stomachs, but the purpose is not clearly understood. They are regurgitated, as are also the indigestible parts of the food, such as fish-bones and squids' beaks. Seals are large eaters, the remains of more than 200 squids having been found in a single fur-seal at one time, although digestion is very rapid. The food is masticated little or not at all, fishes being usually bolted head first. In the capture of their food, as in all their movements in the water, seals are quick and graceful. On land, however, their movements are awkward and progression is chiefly effected by a succession of jerks caused by the upward bending and sudden straightening of the spine, which is remarkably flexible, the limbs being little used by the true seals; the eared seals move mainly by the aid of the limbs. Food is not normally taken on land, and in pursuit of it seals are capable of remaining under water for long periods of time, respiration being very slow.

As regards the intelligence of seals there seems to be considerable difference of opinion, according to the opportunities and point of view of the observer. In captivity some species of seal have shown considerable readiness to learn tricks of more or less difficulty, and trained seals have often been exhibited. On the other hand, observations made on the fur-seal in its native haunts seem to show that while the instincts are strong, there is little real intelligence, and ordinarily stupidity is a marked characteristic. The homing instinct is very strong in most seals, and they will return year after year to their breeding grounds, even though they are sure to meet with slaughter. Most species are also very gregarious, and in their herds they constantly tend to imitate each other, so that they follow their leaders in a perfectly unreasoning way.

Seals are widely distributed in all parts of the oceanic world, but especially in the colder regions. A few species occur in the tropics and temperate regions, but it is in the Arctic and Antarctic parts of the ocean that seals really abound. There they swarm on rocky coasts and on ice-floes during the breeding season, and in the water during the rest of the year. Although seals are normally marine, two species inhabit the Caspian Sea and Lake Baikal.

The classification of the seals and the limits of the species are still much debated subjects and

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SEALS

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are very perplexing. Two principal groups are recognized—true seals (Phocidæ) and otaries (Otariidæ), the former without external ears, which the latter possess; there are also differences in dentition. The Phocidæ are all 'hair'-seals; that is, they have no thick coating of fur under the outer hairy coat. Some of the otaries are also hair-seals, but all fur-seals are otaries. There are three subfamilies of Phocidæ—Phocinæ, Monachinæ, and Cystophorinæ, the first having ten incisors, the second eight, and the third only six. The Phocinæ include many of the best-known species, such as the common seal (*Phoca vitulina*), the harp-seal (*Phoca Grœnlandica*), the floe-rat or ringed seal (*Phoca hispida*), and the freshwater seals (*Phoca Caspica* and *Sibirica*), already referred to.

The common 'harbor' seal is circumpolar in its distribution, and extends in range downward into both the North Atlantic and Pacific oceans. It is locally common along the eastern coast of America, and on the wilder and less frequented parts of the British coast. The pelage is yellowish, variously spotted and marked, with brown above, while underneath it is generally yellowish-white; but there is considerable variability in the coloration. In size the common seal is one of the smaller species, the entire length being from three to five feet. Although gregarious, this species is not found in large 'rookeries,' but small herds are occasionally seen. The skin, which is used for leather and other purposes, and the oil, which is colorless, nearly odorless, and in many ways superior to whale oil, are of sufficient commercial importance to subject these animals to continual slaughter, and their numbers are probably steadily diminishing. The females show some attachment to their young, though their devotion has probably been exaggerated. In captivity the common seal is docile and is said to become attached to its keeper. It is endowed with much curiosity, and there may be some basis for the belief that it is strongly attracted by musical sounds. The sense of smell is very acute and the vocal power ranges from a plaintive bleat to a harsh bark or grunt. The popular name 'sea-calf,' and the specific name *vitulina*, have reference to a supposed resemblance between its voice and that of a calf.

The harp-seal is a much larger and more northern species, reaching a length of eight or nine feet and rarely coming south of Newfoundland. It is extremely gregarious and almost wholly pelagic, resorting to the ice-floes only to breed. It is much sought after by sealing vessels, several hundred thousand being annually slaughtered on the breeding grounds. The floe-rat is one of the smallest seals, although about as long as the common species. It is an Arctic form, and is of great importance to the Eskimos as a source of food and clothing. This is the species which forms a domed cavity in the ice, called by the Eskimos an 'igloo,' after the name of their own winter houses; and it also keeps open breathing holes through the ice. The seals of the Caspian Sea and Lake Baikal are near relatives to the floe-rat, which they resemble in size, though differing in some other details. Their presence in Lake Baikal, a fresh-water lake, is not so remarkable when one considers that the seal often ascends rivers for long distances and has been taken in Lake Champlain.

The Monachinæ are a small group of half a dozen species, all Antarctic, except the two species of monk-seal which are tropical. The European monk-seal (*Monachus albiventris*) occurs in the Mediterranean Sea and adjacent parts of the Atlantic Ocean, while a closely allied species, the West Indian seal (*Monachus tropicalis*), of which little seems to be known, is confined to the Gulf of Mexico, where it is nearly extirpated. (See EXTINCT ANIMALS.) These seals have the first and fifth toes of the hind feet greatly longer than the others, and the nails of both fore and hind feet are very small and rudimentary. The other seals of this subfamily are rare and little known except the sea-leopard (q.v.) of the south temperate and Antarctic seas.

The Cystophorinæ are a small group containing only two or three species, but both of the genera are of considerable interest. The hooded seal (q.v.) is a large Polar species, remarkable for the hood-like distensible sac covering the head of the male and connected with the nostrils. The second genus, Macrorhinus, includes the largest of all seals, the elephant-seals (q.v.), or sea-elephants so called in reference to the proboscis of the male as well as the great size.

Turning to the otaries, or 'eared seals,' it is convenient to recognize two principal groups, the 'sea-lions' or hair-otaries, and the 'sea-bears' or fur-otaries. The former group includes the largest species, some of them attaining a length of fourteen feet. The southern sea-lion (*Otaria jubata*) occurs commonly on the west coast of South America, while the northern sea-lion (*Eumetopias Stelleri*) is found throughout the North Pacific from California to Japan. The common sea-lion of California is, however, a much smaller species, called the black sea-lion (*Zalophus Californianus*), and is often seen in menageries and zoölogical gardens. It is famous as the attraction at the Seal Rocks, close by the Cliff House, near San Francisco. The sea-lions are all very timid animals, easily terrified, and may be driven in herds, even far inland, by means of flags or umbrellas. See Colored Plate of SEALS.

THE FUR-SEALS. The last group of seals to be considered are the fur-seals, by far the most important commercially of all marine mammals. The fur-seals of the Southern Hemisphere are now usually placed in a separate genus, Arctocephalus, which ranges as far north in the Pacific as Guadaloupe Island (29° N.), although mainly confined to the south-temperate and antarctic zones. The skin is of considerable value, and these seals have therefore been eagerly sought wherever they resorted for breeding. They have therefore been practically, if not totally, exterminated, except in some small rookeries in New Zealand and on the west coast of Cape Colony, which are under rigid governmental control, and yield about 7000 skins per annum; and especially on Lobos Island, off the mouth of the Rio Plata, which is leased by the Government of Uruguay to a private company, which so controls the slaughter that about 13,000 skins are furnished annually.

The northern fur-seals (genus Callorhinus) are confined to the North Pacific Ocean. At the present day they breed mainly on the Pribilof, Commander, Robben, Bering, and Kurile islands, the first being the most famous resort. The northern fur-seal varies considerably in size, color, and proportions, and specialists recog-

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nize at least two and perhaps three species. In size the male is very much larger than the female, the difference being especially noticeable in weight. A full-grown male is about 80 inches in length and weighs rather less than 400 pounds, while the female is only about 48 inches long and weighs less than 80 pounds. The color is considerably affected by age, the length of time the seal has been out of water, and the amount of dirt on the fur, but in general the adults are dark gray, with a more or less chestnut or seal-brown cast. The young are black above and brownish-gray beneath, but when three months old have assumed the steel-gray pelage of yearlings. At this stage they are nearly white beneath and the sexes are alike. With increased age the white lower parts become grayish; the female assumes the adult aspect a little more slowly. The pelage in all the fur-otaries consists of the ordinary outer coat of 'water-hair,' and a dense, soft under fur. To prepare a pelt for use as 'fur' the water-hair is removed and the under fur is cleaned. On account of their exceptional warmth, softness, and beauty, sealskins have long been in great demand, and the wanton destruction of breeding females, literally by the millions, in the nineteenth century, so depleted the seal herds that the supply is always less than the demand. The high prices thus constantly obtainable have led to the continued existence of a considerable fleet of vessels which hunt and slaughter seals, wherever they can find them, regardless of age or sex. Ever since the discovery of the Pribilof Islands in 1786, the competition for the skins of the seals breeding there and elsewhere in the North Pacific has been so keen that the animals have been in imminent danger of extermination. The organization of the Russian-American Company in 1799, however, improved conditions somewhat, as the killing of the seals was legally restricted to the employees of a single corporation, which had the greatest interest in the maintenance of the herd. At first the slaughter was indiscriminate as to age or sex, but regulations protecting the females and young were soon made, so that when the Pribilof fur-seal herd came under the control of the United States in 1867, it was in a prosperous condition. Since then it has been sadly depleted. For a discussion of the Alaskan seal question, see SEALING.

The great evil of pelagic sealing lies in the fact that the nursing mothers wander far in search of food, while the males do not take food during the breeding season, but remain on the islands. Consequently practically all the seals taken by pelagic sealers are nursing females, the death of which ordinarily results in the starvation of the pups. There can be no doubt that pelagic sealing is suicidal, the catch showing an annual decrease since 1894, while it is probable that the profits to each vessel engaged in it are extremely small. Recent calculations based on the most trustworthy figures indicate that the Pribilof herd of breeding seals did not in 1903 exceed 60,000 females, and unless remedial measures be devised and enforced the early extinction of the herd is probable.

The terms used in reference to the fur-otaries present a curious anomaly. The animal so generally called 'fur-seal' is properly a sea-bear, and very probably more nearly related to the bears than to the true seals. The male is called a 'bull' and the female a 'cow,' but the young one is a 'pup,' which if a male becomes a 'bachelor.' The 'cows,' moreover, are gathered in 'harems' on a 'rookery' and, to cap the climax, the capture of these mammals is commonly designated as a 'fishery'!

For full particulars, in every detail, regarding the fur-seal and the sealing industry, consult the remarkable four volumes issued by the United States Treasury Department in 1899, designated *Report of Fur Seal Investigations.*

SEA-LEOPARD. A seal (*Ogmorhinus leptonyx*) of the monk-seal group, widely distributed in the southern oceans. It grows to be ten feet long and is the largest of the southern hair-seals, excepting the elephant-seal (q.v.). It takes its name from its spotted gray-and-white coat.

SEALING. An important industry, chiefly of Alaska, notable for the international complications to which it has given rise. The Alaskan seal fishery is the most valuable of its kind in the world, and was one of the chief considerations that induced the United States to purchase Alaska from Russia in 1867. It has afforded considerable revenue to the United States by the lease of the privilege of taking seals, in fact an amount in excess of the price paid for Alaska, and gives employment to large numbers of natives. From 1870 to 1890 the seal fisheries, 'carefully guarded and preserved,' yielded 100,000 skins a year. The company to which the administration of the fisheries was intrusted by a lease from the Government paid a rental of $50,000 per annum and in addition thereto $2.62½ per skin for the total number taken. The skins were transported to London to be dressed and prepared for the markets of the world, and the business had grown so large that the earnings of English laborers since the acquisition of Alaska by the United States had amounted by 1890 to $12,000,000. Then came the depredations of Canadian vessels with their indiscriminate slaughter of the seals, so that the Government was compelled to reduce by 40 per cent. the number that could be taken, while the actual number taken came to be far short of the number allowed.

During the breeding season the colony of seals have a habit of crossing from their fixed habitation on the Alaskan shore to the Pribilof Islands, also the property of the United States, for the purpose of producing and rearing their young. In making this passage they cross a portion of the Bering Sea, which is considerably more than three miles outside of either shore, and therefore beyond the usual limit of jurisdiction recognized as belonging to any particular nation. Beginning in about 1886, it became the practice of certain Canadian vessels to intercept the passing seals while beyond the three-mile limit and shoot them in the water, often killing both male and female. As a result of this ruthless course it became evident that the fisheries were in a fair way to be wantonly destroyed together with the resulting industries so valuable both to the United States and Great Britain. As soon as these depredations became known to the Government of the United States, during the first administration of President Cleveland, a proposal was made to the Government of Great Britain that a convention be entered into between the two

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SEAL OF SOLOMON, Order of the. An Abyssinian order with two classes, founded by King John in 1874. The decoration is a six-pointed star, formed by two engaged triangles, bearing a jeweled cross and surmounted by the crown of Ethiopia.

SEALSFIELD, Charles. The name assumed by Karl Postl (1793-1864), an Austrian novelist and traveler in the United States, Mexico, and Central America, in early life secretary of a religious Order in Prague, and ordained priest. He fled in 1822 to the United States, where he traveled extensively, mainly in the Southwest. For a short time (1829-30) he was editorially connected with the *Courrier des Etats-Unis*. He afterwards resided mainly in Switzerland. In 1828 he published *Tokeah, or The Wild Rose*, and later some remarkable descriptive novels: *Der Legitime und die Republikaner* (1833, a rewriting of *Tokeah*); *Der Virey und die Aristokraten* (1834, rewritten as *Morton*, 1846); *Das Kajütenbuch* (1840); and the social studies *Lebensbilder aus beiden Hemisphären* (1835-37), *Deutsch-amerikanische Wahlverwandtschaften* (1835-37), and *Süden und Norden* (1842-43).

SEAMAN. In law, any man serving on board a seagoing ship below the rank of officer.

SEAMANSHIP. The science and art of rigging, equipping, manœuvring, and handling a ship or boat under all conditions. The advent of steam as the motive power has changed the character of seamanship to a large extent, but it has not lessened its importance. A moderate but accurate knowledge of steam engineering is necessary for officers as well as thorough information in regard to modern marine meteorology and navigation. Consult: Knight, *Modern Seamanship* (New York, 1902); Luce, *Seamanship* (revised edition, New York, 1898); Todd and Whall, *Practical Seamanship for Use in the Merchant Service* (London, 1896). See Navigation; Sailings; Steam Navigation, etc.

SEAMEN, Laws Relating to. In its broadest sense a 'seaman' is a person engaged in navigation; but with respect to the laws affecting seamen the term is generally used in the sense which it is given in the construction of the British statutes regulating merchant shipping, as "any person (except masters, pilots, and apprentices, duly indentured and registered) employed or engaged in any capacity on board any ship."

Laws for the protection of seamen and sailors have been passed in all maritime countries, and the subject is very fully covered in the statutes of modern civilized nations. Details of the regulations of the English and American statutes differ from each other and from those of the non-English nations, but the general scope and purpose of such laws is the same in all European and American nations. In Great Britain most of the acts governing the subject of merchant seamen were consolidated into the Merchant Shipping Act of 1854 (17 and 18 Vict., ch. 104), and most of the previous acts, beginning with that of Elizabeth, ch. 13, were repealed in the same year. This act, with numerous amendatory statutes, governed the subject until 1894, in which year the acts affecting the subject were again consolidated in the Merchant Shipping Act of 1894. This last act did not materially modify the laws existing under the previous act, but was chiefly important for bringing the laws together in convenient form, and for its greater stringency affecting the provisions insuring the crew against overloading, undermanning, the carrying of dangerous cargoes, the inadequacy of life-saving appliances, and, in general, any deficiency or defect which might make the ship unseaworthy. There are various acts in the British colonies upon the same subject, some of which follow the Imperial statute, but most of them differ in various details. In Great Britain the Merchant Shipping Act of 1894 vests the general control of shipping interests in the hands of the Board of Trade, and provides for the appointment of officers, called superintendents and deputy superintendents, whose general business is to afford facilities for engaging seamen by keeping registries of their names and character, to superintend and facilitate their engaging and discharging, to provide means of securing the presence on board at the proper times of men who are so engaged, and in general to carry out the regulations of the statutes concerning the dealings of the seamen with their employers. The Board of Trade has power to detain any vessel regarded as unseaworthy, subject to an appeal to a court of survey, and is authorized to prescribe a load water-line (usually called 'Plimsoll's mark'), and to provide for the proper indication by marks upon the side of the ship of the levels of the various decks, etc.

In the United States the subject is governed by the provisions of Revised Statutes, sections 4554 to 4591, and the various amendments and additions made subsequent to them.

The terms master, seaman, and owner, in the United States statutes, are defined, for the purpose of the acts, as follows: "Every person having command of any vessel belonging to any citizen of the United States shall be deemed to be the master thereof; and every person (apprentices excepted) who shall be employed or engaged to serve in any capacity on board the same shall be deemed and taken to be a 'seaman,' and the term vessel shall be understood to comprehend every description of vessel navigating any sea or channel or lake or river to which the provision of this title may be applicable; and the term 'owner' shall be taken and understood to comprehend all the several persons, if more than one, to whom the vessel shall belong."

When in foreign countries the seamen may generally look to the consul of the country under whose flag they sail to enforce their rights against the master or owner of the vessel on which they are employed; and the rights of the master and owners are likewise enforced.

No detailed statement of the rights and duties of seamen can be given here. The laws of the United States, which may be taken as showing the spirit of the British laws, in general provide that the seaman must be under written contract duly executed; must present himself on board under severe penalties, and for unauthorized absence from the vessel forfeits three days' wages for an absence of less than forty-eight hours, and all back wages and property on the vessel when longer than forty-eight hours. He may be imprisoned for desertion, but he may not be flogged, as formerly, nor can forfeiture of

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wages be added to any other form of corporal punishment. A seaman is entitled to medical attendance and aid without deduction from his wages, and if he dies on a voyage his heirs receive his full wages for the entire voyage.

The rights of seamen are within the jurisdiction of the admiralty courts when they are engaged in trade or commerce on tide water or on the high seas; but for the purpose of this jurisdiction persons who do not contribute to the aid of the navigation of the vessel, or to its preservation in the course of their occupation, are not to be considered seamen; and, on the contrary, any person whose regular occupation would not impose these duties upon him may get the rights of a seaman by temporarily assuming the duties of one. See ADMIRALTY LAW; MARITIME LAW; and consult the authorities there referred to, and the statutes of the various nations.

SEA-MOUSE. A sea-worm (see ANNELIDA) of the genus Aphrodite. It is broad, short, somewhat flattened, and so densely covered with long fine setæ, or bristles, as to resemble a mouse. It grows to the length of about two inches, and is not uncommon in the North Atlantic at a depth of from five to twenty fathoms.

SEA-OTTER. A marine otter (*Enhydris* or *Latax Marina*) of the North Pacific shores and islands. It yields the most valuable of furs. It is about three feet long from nose to root of tail, and the tail is about 10 inches long. Its form is robust, the head massive, the color dark liver brown, paler on the head, and the tail is terete and obtuse. The hind feet are very broad, forming swimming organs like a seal's flippers, but with furry soles; the fore paws are small and cat-like, and their palms are naked. The dentition resembles that of the otters (Lutra), but a pair of incisors in each jaw is lacking, and the molars have lost the sharp points seen in other Mustelidæ, in accordance with its peculiar diet. When Alaska was first visited by Russian traders they found this animal numerous on all the coasts of Alaska and of the Aleutian chain and other islands of Bering Sea, and as far south as Puget Sound, and secured thousands of their valuable pelts; but the onslaught made upon the race by Russian and Hudson Bay fur traders and the Indians reduced it so rapidly that the otter soon became rare except upon the most remote and difficult islands, where it would long ago have become extinct had not rude measures been taken for its preservation. In spite of all attempts at protection, however, fewer skins are obtained annually, and the price of the fur has correspondingly increased, until now a fine skin is worth in Liverpool $500, and even $1500 has been paid for special examples. One reason for the modern scarcity of the fur is the fact that the animal has changed its habits somewhat under the influence of man's persecution, and now spends much more of its time in the sea, and seeks its food more constantly in deep water than formerly. Its food consists mainly of crabs and sea-urchins with some fish. It has been most extensively studied and described by H. W. Elliott, whose many observations and statistics are summarized by Coues in his monograph *Fur-Bearing Animals* (Washington), where references to many other authorities will be found. See Plate of FUR-BEARING ANIMALS.

SEA-PEN. An alcyonarian (q.v.) coral of the family Pennatulidæ, in which the colony is bare of polyps at its base, while the lateral branches nearer the tip bear them in large numbers. These branches are arranged in series on opposite sides of the central shaft so that the entire colony looks something like a rather stiff feather or quill pen. Sea-pens occur in water of moderate depth, on sandy or muddy bottoms, where they are only lightly attached by the bare end of the shaft. They ordinarily reach a length of several inches, but an Arctic species of deep water (*Umbellularia Grœnlandica*) may be four feet long. Some of them are richly colored, and some are highly phosphorescent.

SEA-PERCH. See BASS; SEA-BASS.

SEA-RAVEN, or DEEP-WATER SCULPIN. A large, reddish-brown, much variegated sculpin (*Hemitripterus Americanus*) of the coast of New England and Canada, which has a great number of spiny cirri, and dangling fleshy appendages, a spinous dorsal fin of great length, and generally extraordinary aspect. See illustration under SCULPIN.

SEARCH (from OF. *cercher*, *cerchier*, Fr. *chercher*, to search, from Lat. *circare*, to go around, traverse, from *circus*, ring, circus, Gk. κίρκος, *kirkos*, κρίκος, *krikos*, circle), RIGHT OF. As a part of the law of nations, the right of a belligerent to stop neutral merchant vessels on the high seas for the purpose of ascertaining their nationality and destination, and the character and ownership of their cargoes, with a view to determining their liability to capture. This right follows as a necessary incident of the belligerent right of capturing an enemy's property at sea, of seizing contraband of war, and of blockading an enemy's coast, since liability to capture cannot be determined until a search has been made. But the right of search in such cases is restricted to merchant vessels only, and has no application to the public armed vessel of a neutral or the merchant vessel of a belligerent. This somewhat extraordinary usage is strictly a belligerent right, comes into existence at the outbreak of war and ends with the conclusion of hostilities. All neutral vessels of whatever character are liable to search by a properly documented armed vessel of either belligerent and are subject to seizure and condemnation upon refusal to submit, although they may have been engaged in innocent traffic. But the belligerent whose vessel makes the search may be held responsible to the neutral concerned if the search is not conducted in a manner warranted by the law of nations. Thus any injury done to the cargo or any oppressive or insulting conduct during the search would be sufficient ground for complaint. Unless regulated by treaty the manner in which the search is to be conducted is determined by the usage of nations. This matter is now frequently the subject of treaty regulation, and where so regulated the distance at which the searching vessel shall remain from the vessel to be visited, the number of persons permitted to take part in the search, and the amount of evidence necessary to satisfy the belligerent of the innocent character of the vessel are all specified. The notification of intent to visit a neutral vessel is usually given by firing an unshotted gun, which should be followed by

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tance at which the searching vessel shall remain while the search party is on board is usually stated to be "not within the range of a cannon shot." The search party is limited to an officer, a boat's crew, and one or two persons to assist in the work of conducting the search. If the vessel's documents indicate neutral origin and destination it is allowed to proceed; if they are fraudulent or indicate hostile destination search is made for contraband articles, and if any be found the ship is declared a good prize and sent into port for condemnation.

To prevent the annoyances incident to the right of search, governments have sometimes arranged with one another that the presence of a public armed vessel with a fleet of neutral merchant vessels shall be regarded as sufficient evidence that they are engaged in a lawful trade. Many neutrals, among them the United States, have even claimed this as a right of international law without the necessity of sanction by treaty, but others, like England, deny the right. In addition to the belligerent right of search, a similar usage with respect to foreign vessels is permissible in the following cases: to search vessels within the territorial waters of a State as a means of executing revenue laws; to search vessels on the high seas on suspicion of piracy; to search merchant vessels on the high seas for the purpose of ascertaining their nationality. In general, European nations have conceded the reciprocal right of detention and visitation of their vessels suspected of being engaged in the slave trade.

Prior to the War of 1812 the British Government took advantage of the right of search to exercise what it regarded as its right of impressment (q.v.). For many years in connection with the suppression of the slave trade Great Britain endeavored to obtain the consent of the other maritime powers to a qualified right of search in time of peace. Before the year 1820 the British Government had succeeded in making treaties to this effect with Denmark, Spain, Portugal, and the Netherlands. Similar concessions concerning the right of search in time of peace were obtained by Great Britain from France in 1831-33, from Denmark and Sardinia in 1834, from the Hanse Towns and Tuscany in 1837, from Naples in 1838, and from Haiti in 1839. In 1841 a treaty conceding mutually a qualified right of search for the purpose of suppressing the slave trade was negotiated between Great Britain, Austria, Russia, Prussia, and France, but France, largely influenced by Lewis Cass, then United States Minister at Paris, refused to ratify this quintuple treaty. Throughout this period the British Government made repeated but uniformly unsuccessful efforts to obtain a recognition of the right of search from the United States Government, and in the progress of the negotiations endeavored to distinguish between the right of search and the right of visit, though the United States never assented to the distinction. On April 7, 1862, during the Civil War, Secretary of State Seward, evidently desiring to conciliate the British Government, signed a treaty for the suppression of the slave trade, which provided, among other things, that the United States and Great Britain should have a mutual right of search. The right, how-

in Schuyler, *American Diplomacy* (New York, 1886).

SEARCH LIGHT. The electric search light consists of an electric arc mounted in the focus of a parabolic mirror. The mirror receives the rays which diverge from the lamp and by virtue of the properties of a parabola reflects them in a direction parallel to the axis. The search-light casing consists of a thin metal cylinder, blackened inside to prevent interference of light by reflection, from 18 to 72 inches in diameter and of slightly greater length. It is supported on trunnions or pivots to give it motion in the vertical plane, and the arms carrying the pivots are secured to a pivoted horizontal plate which permits lateral movement. The feeding in the lamp is generally automatic, though hand feed is also provided. The light may be trained by hand or by a search-light controller located at a distance from the light. If reliable in its operation the controller is to be preferred, as it is difficult for the operator to see objects illuminated by the rays when he is too near the light. The earliest practicable search lights were designed by a Frenchman, M. Mangin. In the earliest models the carbons of the lamps were nearly vertical, but in more recent types they are horizontal, as this arrangement permits the crater formed in the carbon to give its full brilliance to reflection and prevents irregular feeding from displacing the incandescent arc from the optical axis of the mirror. See COAST DEFENSE.

SEARCH OF TITLE. In law, a search in the various public offices where instruments which may affect the title to real estate are recorded, in order to determine whether a person has a good record title to real property. If there have been any proceedings involving the transfer or division of the property, such as a partition, the searcher must look up the records of the proceedings and determine whether they were regular, and whether they included all necessary parties, etc. The memorandum of the results of the search is called an 'abstract of title.' A search for conveyances and mortgages is always made for twenty years back, as that is the period required to gain title by adverse possession, and many persons require a complete chain of title from the original grant by the Government to the date of the conveyance. An attorney who searches a title for a client is responsible to the client for any damages which may result from a defective title, if the defect was a matter of record and the attorney failed to find and report it.

See ABSTRACT OF TITLE; RECORDING OF DEEDS; RECORDS, PUBLIC, etc.; and consult the authorities referred to under ABSTRACT OF TITLE and REAL PROPERTY.

SEARCH WARRANT. A warrant or mandate of a court of competent jurisdiction, usually a magistrate's court, addressed usually to the sheriff or a constable, requiring him to search a house or place named in the warrant for property alleged to have been stolen. The warrant requires the officer serving it to seize the property if found and the person named in the warrant and to bring both before the court issuing the

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writ. By a gradual relaxation of practice, the use of the search warrant was early adopted by the common-law courts, and by modern statutes its use has been extended to the search for and seizure of intoxicating liquors, gambling implements, counterfeiters' tools, burglars' tools, smuggled goods, obscene literature, and generally all articles the bare possession of which is made a crime. The use of the search warrant was before the nineteenth century subject to many grave abuses, not only because of its use as a means of securing evidence of political offense, but as a means of securing evidence of crimes chiefly important because of their semi-political character, as in the case of the use of writs of assistance (which were really forms of search warrants) in the American colonies before the outbreak of the Revolution. The final overthrow of these abuses was brought about in the reign of George III., and it is now established that by the common law a search warrant can be issued only on oath or affirmation showing probable cause. It is required to specify definitely the place in which the search is to be made and the property to be seized. If the officer executing the warrant does not comply with its terms, he is civilly liable for all his acts not authorized by it and may be compelled to respond in damages for trespass or assault or both, but if strictly obeying the warrant the officer may break outer or inner doors after demand is made for admittance, and his act is justified by his writ whether he succeeds or not in finding that for which he makes search. The United States Constitution (Fourth Amendment) contains a provision prohibiting the oppressive use of the search warrant; and this provision has been enacted in substantially the same form in all of the State constitutions. This amendment does not operate as a prohibition upon the governments of the several States, but the corresponding provisions of State constitutions have received a similar interpretation. See PROCEDURE; CONSTITUTIONAL LAW; CRIMINAL LAW; and consult the authorities there referred to.

SEA-ROBIN. A fish of the genus Prionotus, of the gurnard family (*Triglidæ*), remarkable for their big-headed, ugly form, and scaleless, mottled body, with a great number of appendages, and many 'rags' about the fins. These ugly shore fishes represent in a dozen species on the American coasts the gurnards of the Old World, and have similar habits. They are scavengers, and greatly detested by the fishermen, whose hooks they rob of bait, and to whom they are worthless.

SEARS, BARNAS (1802-80). An American educator and theologian, born at Sandisfield, Mass. He graduated at Brown University in 1825, studied at the Newton Theological Seminary, and in 1831 became a professor at Madison University. In 1833 he went to Germany, and after pursuing studies at Halle, Leipzig, and Berlin, accepted the professorship of theology at the Newton Seminary, of which he became president. In 1848 he was made secretary and executive agent of the Massachusetts Board of Education. From 1855 to 1867 he was president of Brown University. Afterwards he acted as general agent of the Peabody Education Fund for the Southern States. He edited *The Christian Review*, contributed to the *Bibliotheca Sacra*, wrote a *Life of Luther* gogical and educational

SEARS, ISAAC (1 patriot, one of the lead (q.v.) in New York. Mass., but removed to manded a privateer, against the French, bu wreck. He then enga West Indian trade. I tween the colonists an he allied himself with of the Patriot Party the opposition to the as afterwards, was one of Liberty. He was a of Fifty-One in New Committee of One Hu pany of Connecticut City later in 1775, a Rivington's Loyalist RIVINGTON, JAMES); jutant-general with th by Gen. Charles Lee i of the State Assembly known as 'King Sears.

SEARS, LORENZO educator, born at Se ated at Yale in 1861 ological Seminary, Ne rector of various pari 1885, when he becam English literature at In 1890 he accepted a University. His writ *of Oratory* (1896); *Literary Criticism* (*duction to the Libr* (1901); and *America and National Periods*

SEA-SERPENT. creature supposed to nature, and of hug Many so-called 'sea-s be floating gigantic poises following one ribbon-fish (Regalec for some; giant sq may explain others. of the marine saurian in the depths of the at the surface, is n discussion of this su with illustrations of be found in Wilson, don, 1878); and in C *pent: An Historical* don, 1892).

SEASHORE. T the sea and covered tide. By the Engli belongs to the Crow of fishing on it, a United States the States in whose do may make such rea use by the public Federal laws. Howe of fishing on the sea forms of shell fish t be interfered with Angell, *Treatise of*

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Waters and in the Soil and Shores Thereof (2d ed., Boston, 1847).

SEA-SICKNESS. A reflex nervous affection characterized by nausea, vomiting, and extreme prostration, produced in susceptible individuals by the motion of a ship at sea. Premonitory symptoms of vertigo, headache, and distress and sinking at the pit of the stomach appear almost immediately after a susceptible person is exposed to the motion of rolling water in a vessel. Vomiting of a convulsive character soon comes on, with such an overwhelming prostration as to render the patient utterly regardless of what is going on about him, and almost indifferent to life. A deadly pallor, a profuse cold sweat, and diarrhœa are commonly present. Susceptibility to sea-sickness varies greatly in different persons, and the same individual may exhibit varying degrees of susceptibility at different times. Children and aged persons possess comparative immunity from sea-sickness, and women as a rule suffer more than men. It is believed that persons with a strong heart and a slow pulse are less liable to the affection than irritable individuals, having a rapid pulse and a tendency to palpitation.

The primary cause of sea-sickness is the motion of the vessel, and the pitching, or alternate rising of the bow and stern, is specially apt to induce it. In some persons other regular oscillatory movements bring on a very similar condition; the motion of a swing, a railway train, or even a carriage is enough to provoke nausea and vomiting in these individuals. The exact manner in which such causes produce sea-sickness is not definitely settled. It is now generally believed to be by a reflex disturbance of the nervous system due to the violent and unusual stimulation of the organs of special sensation concerned in maintaining the equilibrium of the body, particularly the semicircular canals of the ear, the eyes, and also of the abdominal viscera, especially the stomach. Very probably no one cause is operative in any case. Some cases seem to be primarily of gastric origin, while others are purely psychical or nervous. It has been suggested that the attack is due to a congestion or hyperæmia of the nervous centres in the spinal cord, which are related to the stomach, and the muscles concerned in vomiting.

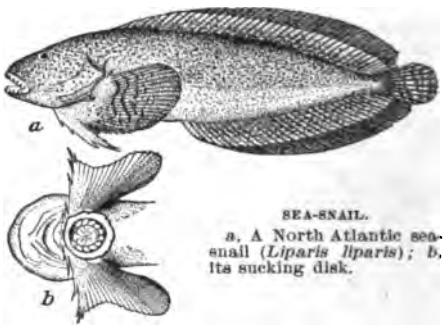
The remedies which have been suggested and used for sea-sickness are innumerable. Most persons are benefited by a preliminary course of calomel and a light diet for several days before sailing. Small doses of strychnine may be taken for a few hours before embarking. A laxative pill at night for the first two or three days of the voyage is also beneficial, together with a simple diet and avoidance of fluids. If in spite of precautions the attack comes on, the patient should at once go to bed, and stay there for a day or two or until the attack subsides. A belladonna plaster over the nape of the neck, and one of mustard, spice, or capsicum over the epigastrium, will sometimes keep all symptoms in abeyance. The surface temperature may be kept up with hot-water bottles if necessary. Vomiting may be combated by taking pieces of ice, iced champagne, ginger ale, or a few drops of brandy; these are better than the hot broths or beef tea usually given. Cocaine in small doses by the mouth is a valuable agent to control severe vomiting. Headache and nausea are often amenable to bromo-caffein or similar preparations. Chloral, the bromides, antipyrine, nitroglycerin, and amyl nitrite are also useful in certain cases. If the onset of the sickness is not sudden and severe, a determined effort to breathe regularly and not in rhythm with the motion of the ship will often overcome the spasmodic muscular contractions and the tendency to vomit. Compression of the abdomen by a broad tight belt will sometimes give relief. Lastly, the patient should not remain too long below deck. All unpleasant symptoms will sometimes quickly vanish on a return to the fresh air and sunshine. See VOMITING.

SEASIDE GRAPE (*Coccoloba uvifera*). A small West Indian tree of the natural order Polygonaceæ, which grows on the seacoasts. It attains a height of 20 feet or more; has leathery, shining entire leaves, and a pleasant, subacid, edible fruit, half an inch in diameter, somewhat resembling a currant, formed of the pulpy calyx investing a bony nut. The wood is heavy, hard, durable, and beautifully veined, and when boiled yields an astringent red coloring matter, sometimes called Jamaica kino.

SEASIDE SPARROW. One of several small conspicuously streaked marsh-sparrows constituting the genus Ammodramus, and found numerously in four species in the Eastern United States, specifically *Ammodramus maritimus*. The sharp-tailed and Henslow's sparrows are others.

SEA-SLUG. A shell-less creeping mollusk of the nudibranchiate group. (See NUDIBRANCHIATA and accompanying Colored Plate.) The term is also sometimes applied to holothurians (q.v.).

SEA-SNAIL. A fish of the family Liparididæ, consisting of small sluggish, goby-like fishes of Arctic and Antarctic seas, which creep about the rocks at various depths, adhering to them by



SEA-SNAIL.
a, A North Atlantic sea-snail (*Liparis liparis*); b, its sucking disk.

a ventral sucking disk (see illustration), formed of the modified ventral fins. They feed upon both vegetable and animal substances.

SEA-SNAKE. One of the poisonous marine snakes of the elapine subfamily Hydrophidæ. They are from two to four feet long, and have the tail, and sometimes the entire body, compressed vertically in adaptation to their swimming life. They are absolutely aquatic, and die when kept long out of the water, though they go ashore to bear their young, which are born alive, and are guarded by the mother for a period. They cast their skins piecemeal. These serpents are found in about 50 species of several genera, from the Persian Gulf to the Philippines (casually to Japan), and also on the coast of Central America. They abound, sometimes in

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of the State University and of Fort Lawton. The annual appropriation for the maintenance of parks is about $60,000. Edifices of importance are the city hall, county court-house, the high school, Providence Hospital, and the seven buildings of the University of Washington (q.v.). The Federal Government has purchased for $150,000 land on which to erect a $750,000 building for its various departments. A public library building ($200,000), the gift of Andrew Carnegie, is in course of construction (1903), the site having been acquired by the city at a cost of $100,000. The Public Library contains some 40,000 volumes.

Commercially and industrially, Seattle is one of the foremost cities of the Pacific Coast. It has valuable fisheries and a tributary region rich in timber and in mineral and agricultural resources. The opening of the Alaskan gold fields, for which the city is a popular sailing point, and the development of trade with the Orient, especially with the Philippines since the Spanish-American War, have contributed to the remarkable growth of the city in recent years. The waterway connecting Puget Sound with Lakes Union and Washington, which is now under construction by the Federal Government, will add much to its shipping advantages. The project contemplates the creation of a canal, nearly eight miles long and of sufficient depth for the largest merchant and war vessels, leading to the fine fresh-water harbor afforded by Lake Washington. The value of Seattle's trade by sea in 1901 was $45,596,067, including goods to the amount of $6,958,613 carried to Japan by a single line. In that year shipments by water included some 25,000,000 feet of lumber, 470,000 tons of coal, 88,000 bales of cotton, 1,214,000 bushels of wheat, and 475,000 barrels of flour. Large quantities of beer, meats, fruit, hay, oats, and manufactured goods are also exported. Seattle is one of the chief ports of the country for the receipt and shipment of gold and silver. The Federal Government in 1898 established an assay office here. Lumber and shingles constitute the principal shipments by rail to Eastern markets.

Manufacturing interests, too, are of importance. In the census year 1900, $10,132,000 capital was invested in the various industries, which had a production valued at $26,373,000. The manufacture of lumber, slaughtering and meat-packing, flour-milling, fish canning and preserving, the manufacture of foundry and machine shop products and bridge work, ship and boat building, the roasting and grinding of coffee and spices, bottling, and the manufacture of confectionery, dairy products, furniture, and carriages, are the leading industries. Electric power, used in Seattle for manufacturing and other purposes, is derived from Snoqualmie Falls, on the river of the same name, 24 miles from the city. The falls are 270 feet high, with water power at high water estimated at 100,000 horse power, and at low water 30,000 horse power. The Puget Sound Naval Station is at Port Orchard, 14 miles from Seattle. Here is a dock 650 feet long, constructed at a cost of more than $600.000.

The government is vested in a mayor, elected biennially, and a common council, consisting of a single chamber. The administrative officers include a treasurer, comptroller, corporation counsel, boards of public works, health, parks, library, etc. The public school affairs are controlled by a board of education, separate from the municipality. The water-works, which cost $2,500,000, are owned by the city. The daily supply is 23,000,000 gallons. The reservoirs in the city have a storage capacity of 50,000,000 gallons. The municipal water revenues in 1901 were $227,000. The city is engaged (1903) in the installation of an electric plant to cost $550,000.

First settled in 1852, Seattle was laid out in 1853 and named after a noted Indian chief. In 1856 it was unsuccessfully attacked by the Indians. The business portion was almost entirely destroyed by fire in 1889, the loss aggregating about $10,000,000. The population in 1870 was 1107, and in 1880, 3533; in 1890, 42,837; in 1900, 80,671.

SEA-URCHIN. The name applied to species of the echinoderm class Echinoidea. The sea-urchin of the coast north of Cape Cod (*Echinus* or *Strongylocentrotus Drobachiensis*) is common among rocks, ranging from low-water mark to fifty or more fathoms. It eats seaweeds, and is also a scavenger, feeding on dead fish and the like. Certain kinds are known to bore for a little way into limestone rocks or coral reefs, where they are protected from the waves. Sea-urchins have scattered over the surface, among the spines, microscopic button-like bodies called *sphæridia*, which are thought to be organs probably of taste or smell. They evidently react to odors. The eggs are numerous and small. After hatching the young sea-urchin enters the free-swimming larval or pluteus stage, passing through a complicated metamorphosis. On the other hand, certain forms (*Anochanus Sinensis*) have a direct development, the larval stage being suppressed. A Chilean form and also a South Pacific species of Hemiaster carry their young in brood-pouches, and they also directly develop, for no pluteus sea-urchin larvæ were captured by the *Challenger* expedition in the Southern Ocean. The large sea-urchin of the Mediterranean is an article of food, and the Indians of the northwest coast eat the large local species. See ECHINOIDEA; ECHINODERMATA.

SEAWEED or **SEAWARE.** In a wide sense, any plant of the class Algæ; in a more restricted sense, only plants of this class which live in the sea. The term is also applied to any plant growing in the sea. Several species are edible, the most important of these being Irish or carrageen moss, used as a cattle food and also in the preparation of jellies (blanc mange and similar dishes). Dulse, or dillesk, and kelp, or tangle, are also used to a limited extent as human food.

Eel grass has been used in filling mattresses, cushions, etc., and in sheathing houses. Seaweed ashes formerly supplied much of the alkali used in soap and glass making and for the preparation of iodine. (See KELP.) As a rule, however, cheaper sources of most of the materials furnished by seaweed have been discovered. The principal use of seaweed is as a manure, for which purpose it is extensively employed on many coasts, some of the best farms of New England being maintained largely by the use of seaweed. Exact data as to the quantity used are not available. The use of seaweed as a manure is confined to a narrow strip of coast because the material is very bulky (contains from 70 to 90 per cent. of water), and consequently cannot be profitably transported far. It has been carried

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inland, however, to a distance of from 8 to 10 miles. It is undoubtedly an economical practice to allow the seaweed to dry partially on the beach before carting it, but it is not advisable to allow it to dry out so thoroughly that it will not readily decompose in the soil. It should not be subjected to any considerable amount of fermentation or leaching, since a large proportion of its valuable constituents—nitrogen and potash—would thus be lost. On account of its bulk and wateriness, seaweed must be applied in very large amounts (20 to 30 tons per acre) in order to supply sufficient amounts of nitrogen, phosphoric acid, and potash for the needs of crops. The potash of seaweed, which is probably its most important fertilizing constituent, is subject to wide variation. Fresh seaweed often contains 1 per cent. and more of this constituent, but it is soluble and is rapidly lost if the weed is subjected to washing. The lime is also very variable, owing to the adherence of shells, etc., but normally it is probably less than 1 per cent.

Seaweed belongs to the same class of manures as barnyard manure and green manures, and, like them, proves valuable on porous, sandy soils. It differs from average barnyard manure in its higher percentage of potash and lower percentage of phosphoric acid. While, like barnyard manure, it is a general fertilizer, it is not so well balanced, and since its continued use alone is likely to result in a one-sided exhaustion of the soil, bone or other phosphatic fertilizer should be applied with it. An advantage which seaweed has over barnyard manure is its freedom from weed seeds, insects, etc. Since it contains soluble potash, it is considered a potassic manure especially valuable for crops like potatoes, clover, etc., which are 'potash feeders.'

The nitrogen of seaweed is in organic form, and is therefore not available to plants until decomposition and nitrification have taken place, processes which usually occur rapidly in the soil. It may be applied fresh as a top-dressing (on grass) or may be plowed in. On account of the rapid decomposition, especially of the more succulent and mucilaginous kinds, seaweed furnishes a valuable means of starting fermentation in manure, compost heaps, peat, etc. Eel grass is about as rich in fertilizing constituents as the other kinds analyzed, but is of less actual fertilizing value because it decomposes slowly in the soil, for which reason it has been condemned as a worthless manure, although valuable as a mulch. Its value as a fertilizer could no doubt be greatly increased by composting. The objections to the use of seaweed ashes as a fertilizer are the difficulty and expense of burning and the loss of nitrogen. Seaweed, when applied in the spring, has been found to injure the quality of potatoes, probably on account of the chlorine it contains. It also apparently delays maturity as compared with barnyard manure. It seems, however, to reduce scab when applied at planting. Undoubtedly the safest practice with potatoes and other plants injured by chlorine is to apply the seaweed the previous summer or fall. Consult *Rhode Island Experiment Station Bulletin 21*; *Transactions Highland and Agricultural Society*, 1898, p. 118; *Agricultural Students' Gazette*, new series 9 (1898), p. 41; Storer, *Agriculture in some of Its Relations with Chemistry* (New York, 1897).

SEA'WELL, MOLLY ELLIOT (1860—). An American author. She was born in Gloucester County, Va., October 23, 1860, and began to write at an early age. She published her first novel in 1889, but attracted wider public attention in the following year by *Little Jarvis*, a story for boys. Perhaps the most noteworthy of her novels is *The Sprightly Romance of Marsac* (1896), a lively tale constructed on a French model. Others are *Throckmorton*, *Maid Marian*, *Children of Destiny*, *The Loves of the Lady Arabella*, *The House of Egremont* (1899), and *The Fortunes of Fifi* (1903). Some of her juvenile stories have been very popular; the best of them is perhaps *Gavin Hamilton*.

SEB, or KEB. An Egyptian deity, identified by the Greeks with Cronos. (See SATURN.) He was the husband of Nut (q.v.), and is sometimes called the father or leader of the gods, since he was the father of Isis, Osiris, Typhon, and Nephthys. Seb plays but little part in Egyptian mythology, excepting in the legend of the destruction of mankind by Re.

SEBAL'DUS (?-801). A saint in the Roman Catholic Church, and one of the patron saints of Nuremberg. He is said to have been the son of a Danish king. He studied in Paris and, according to the tradition, married a daughter of King Dagobert III., but on the day following their marriage the vows were dissolved, and for the ensuing years Sebaldus was a stern ascetic, and lived as a hermit in a forest near Nuremberg. He was buried in Saint Peter's Church at Nuremberg. He was canonized by Pope Martin V. in 1425. The day of his death, August 19th, is still commemorated in Nuremberg.

SEBASTE, See SAMARIA.

SEBAS'TIAN, DOM (1554-78). King of Portugal from 1557 to 1578. He was the posthumous son of the Infante John and succeeded his grandfather John III. on the throne, under the guardianship of his grand-uncle the Cardinal Henry. Ambitious of a conqueror's fame and desiring also to further the spread of Christianity in Northern Africa, Sebastian took advantage of the internal disputes raging in Morocco to invade that country in the summer of 1578, but on August 4th the Portuguese army was almost annihilated at Kasr-el-Kebir (Alcazar Quivir) by the forces of the Sherif Muley-Malek. Sebastian was among the slain, but his body was never found, or at least never satisfactorily identified, and this gave occasion for the appearance of several pretenders, claiming to be the missing King, the most prominent of whom made himself known at Venice in 1598, and after a career of two years fell into the hands of the Spaniards, who probably put him to death. In popular Portuguese legend, Sebastian is not dead, but will reappear to restore the people to their ancient glory. Consult: Machado, *Memorias para a historia de Portugal que comprehendem a governo del rey Dom Sebastião* (Lisbon, 1736-51); d'Autas, *Les faux Don Sébastien* (Paris, 1865).

SEBASTIAN (Lat. *Sebastianus*), SAINT. A celebrated martyr of the early Church. His history is contained in the *Acta Sancti Sebastiani*, which probably dates from the close of the fourth century, and is believed to embody in the main a trustworthy tradition. Sebastian, according

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to this narrative, was born at Narbonne, in Gaul, and educated at Milan. Although a Christian, he entered the Roman Army, without revealing his religion, and with the view of assisting and protecting the Christians in persecution. He rose to high favor under Diocletian, and became commander of the first cohort at Milan. When his religion was discovered he was condemned to death in Rome by a troop of Mauritanian archers, who transfixed him with numberless arrows, and left him as dead. But a Christian lady, Irene, finding that life was not extinct, had the body removed to her house, where life was restored; and although the Christian community desired to conceal his recovery, Sebastian again appeared in public before the Emperor, to profess his faith in Christianity. Diocletian condemned him to be beaten to death with clubs in the amphitheatre; and his body was flung into one of the sewers of the city, in which it was discovered, according to the *Acta*, by means of an apparition, and carried by a Christian lady, Lucina, to the catacomb which is still called by his name. The date of his martyrdom was January 20, 288, and this is his feast day with the Latins. By the Greeks the feast is held on the 18th of December. The festival was celebrated with great solemnity in Milan as early as the time of Saint Ambrose, and it was observed in the African Church in the fourth century. Sebastian is patron saint against the plague. It is related that in 680 a great pestilence in Rome ceased when an altar was dedicated to him in the Church of Saint Eudocia. The martyrdom of Saint Sebastian is one of the most familiar subjects of Christian art. He is usually represented as young and beautiful, bound to a tree, and pierced by many arrows. There is another saint of the same name who is said to have suffered martyrdom in Armenia.

SEBASTIANI, sā'bȧs-tē-ä'nē, FRANÇOIS HORACE DE LA PORTA (1772-1851). A marshal of France. He was born November 10, 1772, near Bastia, in Corsica. He entered the army as a sub-lieutenant of infantry in 1792, and was one of Napoleon's most devoted partisans. He fought at Marengo (1800), and became brigadier-general in 1803 and was wounded at Austerlitz (1805). In May, 1806, he was sent as diplomatic representative to Turkey, where he succeeded in alienating the Porte from Russia and England. He fought in Spain in 1807 and distinguished himself in the Russian campaign of 1812, and at Leipzig in 1813, and fought with extreme bravery in the campaign of 1814. On the exile of Napoleon to Elba he gave his adherence to the Bourbon Government, but joined his old master on his return. He was Minister of Marine for a short time in 1830 and Minister of Foreign Affairs, with a slight interruption, from 1830 to 1834. He then went as Ambassador to Naples, and, 1835-40, to London. He was made a marshal of France in 1840.

SEBASTIANO DEL PIOMBO, sā'bȧs-tē-ä'nô dĕl pē-ôm'bô (c.1485-1547). An Italian painter of the High Renaissance. His surname was Luciani, and he derived his name from his office of the Papal seal (*piombo*). He was born in Venice, was a pupil of Bellini and of Giorgione, and Morelli sees in his earliest works the influence of Cima da Conegliano. To his Venetian period belong a "Pietà," in possession of Lady Layard (Venice), and the altar-piece of San Giovanni Crisostomo at Venice, in the manner of Giorgione. In 1509 he was invited to Rome by Agostino Chigi, for whom he painted in the Villa Farnesina eight lunettes in the garden lodge, and in the grand hall a "Polyphemus," as pendant to Raphael's "Galatea." Having gained but little success in this rivalry, he formed in 1512 his association with Michelangelo, endeavoring to unite Venetian coloring with the latter's drawing, and thus to surpass Raphael. Michelangelo himself designed the "Pietà" in the Hermitage (Saint Petersburg), and another in San Francesco at Viterbo, and parts of the "Resurrection of Lazarus" (1519, National Gallery, London), which is Sebastiano's principal historical production. Other works showing his influence are the "Martyrdom of Saint Agatha" (1520, Pitti Palace); "Visitation" (1521, Louvre); a "Transfiguration" in fresco, and a "Flagellation" in oil, in San Pietro in Montorio (Rome).

Under Michelangelo's influence Sebastiano lost the Venetian breadth of handling; his paintings became smooth in character and heavy in chiaroscuro. He devoted much time to adapting oil painting to fresco, and endeavored in vain to induce Michelangelo to adopt his experiments in the Sistine Chapel. His paintings on slate, like the "Holy Family" at Naples, and on stone, like the two "Ecce Homo" at Madrid and Saint Petersburg, are very interesting. In 1531 he was appointed keeper of the Papal seals, and from this time he practically ceased painting, residing at Rome until his death there, on June 21, 1547.

In portraiture Sebastiano's art was more independent, and he achieved the highest results, both as to characterization and perfection of technique. In his portraits the influence of Raphael is apparent, so much so that some of the most beautiful portraits formerly attributed to the latter are now recognized as Sebastiano's —as, for example, the matchless "Fornarina" (1512), in the Uffizi, long supposed to be the mistress of Raphael, and the portrait of an unknown young man in the gallery of Budapest. Morelli also ascribes to his early period the beautiful "Violin Player," in the Sciarra Palace, Rome. He painted the portraits of a series of popes, the best known of which is that of Clement VII., in the Naples Museum. Other celebrated examples are those of Andrea Doria, in the Doria Palace, Rome, and of Cardinal Pole in the Hermitage (Saint Petersburg). Consult: Vasari, *Vite* (Florence, 1878); Richter, in Dohme, *Kunst und Künstler Italiens* (Leipzig, 1878); Milanesi, *Les correspondants de Michel Ange*, vol. i. (Paris, 1890); and the dissertation by Propping (Leipzig, 1892).

SEBAS'TOPOL, or **SEVASTOPOL,** *Rus. pron.* syĕ-vȧs-tą'pŏl-y'. A seaport of Russia, in the Government of Taurida, on the southern shore of a deep inlet of the Black Sea, in the southwestern part of the Crimea, about 48 miles southwest of Simferopol (Map: Russia, D 6). The inlet is about 4 miles long and three-quarters of a mile wide, and is one of the best roadsteads of Russia. The main inlet forms four bays, between two of which the city proper stands on elevated ground. The entrance to the roadstead is strongly fortified, and there is a chain of forts south and north of the city. There are

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extensive docks along the shore. The climate is very healthful and pleasant. The city has fully recovered from the effects of the Crimean War, but its commerce has been deflected almost entirely to Feodosia, and the harbor is used mostly as a naval station. There are monuments to the heroes of the Crimean War and two museums. The principal industries are shipbuilding and wine-making. Sebastopol forms with the surrounding country a separate administrative district. The population of the city proper, in 1897, was 44,016. The Greek colony of Chersonesus, situated near the present site of Sebastopol, was well known to the Russians under the name of *Korsuñ* at the period of the introduction of Christianity into Russia. In the sixteenth century the Tatar settlement of Akhtiar was founded here. In 1784 the town of Sebastopol was founded by Catharine II., and in 1804 it became the chief naval station of Russia on the Black Sea. It was strongly fortified under Nicholas I. See CRIMEAN WAR.

SEBENICO, sâ-bā'nê-kô (Slav. *Šibenik*). A town in the Crownland of Dalmatia, Austria, at the mouth of the Kerka in the Adriatic, 170 miles southeast of Triest (Map: Austria, E 5). It is built on a steep slope, and was formerly defended by walls and towers. The town has an excellent harbor, connected with the sea by a canal. There is considerable shipping trade. Population (commune), in 1900, 24,751.

SÉBILLOT, sâ'bê'yô', PAUL (1843—). A French painter and folk-lore writer, born at Matignon, Côtes-du-Nord, and educated at Rennes. He went as a young man to Paris to become a notary, but turned instead to painting. Between 1870 and 1883 he exhibited more than twenty pictures in the Salon. His sketches of out-of-the-way corners in Brittany introduced him to the subject to which he afterwards devoted himself, that of folk-lore study. In 1885 he founded and edited the *Revue des Traditions Populaires*. His works on folk-lore include: *Contes populaires de la Haute Bretagne* (3 series, 1880-82); *Traditions et superstitions de la Haute Bretagne* (1882); *Gargantua dans les traditions populaires* (1883); *Contes des provinces de France* (1884); and *Légendes, croyances et superstitions de la mer* (1886-87).

SEBORRHŒA (Neo-Lat., from Lat. *sebum*, tallow + Gk. *ῥοία*, *rhoia*, flow, from *ῥεῖν*, *rhein*, to flow). A disease of the sebaceous glands characterized by an increased flow of their secretion. Seborrhœa may invade the hairy parts, appearing in one of four varieties: (1) Dry seborrhœa; (2) concrete seborrhœa; (3) oily seborrhœa; (4) circinate seborrhœic eczema; or it may invade the smooth parts, appearing as (1) seborrhœa sicca; (2) seborrhœa concreta; (3) seborrhœa oleosa; or (4) seborrhœa corporis.

All these varieties are characterized by the formation of collections of sebum with dust, scales of the epidermis, and crusts, more or less oily, more or less gray or dark. It is probably parasitic; but while many parasites have been discovered in eczema seborrhœicum, their precise rôle is yet undetermined. Seborrhœa is the most frequent cause of baldness, and needs treatment by a physician. Besides internal tissue-builders, tonics, and special food, local applications of belladonna, benzoin, sulphur, chloral, salicylic acid, ichthyol, and green soap are useful in selected cases.

SECANT. See TANGENT; TRIGONOMETRY.

SECCHI, sĕk'ê, PIETRO ANGELO (1818-78). An Italian astronomer, born at Reggio. He joined the Jesuit Order in 1833, and after studying in Italy, England, and at Georgetown College in Washington, D. C., he served for a time as professor of mathematics and physics at the latter institution. He became director of the observatory of the Roman College in 1849, and was permitted to remain in that position after the expulsion of the Jesuits, 1870-73. His discoveries in solar physics and spectroscopy were numerous and important, and he also made magnetic and meteorological observations. Among his works are: *Catalogo delle stelle* (1867); *Novi ricerchi sulle protuberanze solari* (1869); *Fisaca solare* (1869); *Researches on Electrical Rheometry* (Smithsonian Contributions, vol. viii., 1852); *Le soleil* (1870); and *Le stelle, saggi di astronomia siderale* (The Stars, vol. xxxiv. of the International Scientific Library, Leipzig, 1878). Consult Pohle, *Angelo Secchi* (Cologne, 1883).

SECESSION (Lat. *secessio*, separation, schism, from *secedere*, to go apart, from *se-*, apart + *cedere*, to yield, depart, go). In United States history, the term applied to the withdrawal of a State from the Union. The word 'secession' seems to have been first used in the debates in the Philadelphia Convention on July 5, 1787, by Elbridge Gerry, who remarked that unless some compromise should be made "a secession would take place." The idea of secession appeared in New England about fifteen years after the formation of the Union in connection with the acquisition of Louisiana. This addition of territory was strongly opposed by the New England Federalists through fear that ultimately it would result in the destruction of New England's predominance in the Union. Annexation of Louisiana was vigorously resisted as unconstitutional without the consent of all the States, inasmuch as the Constitution was alleged to have been made only for the original thirteen States.

Jefferson's Embargo Act and the War of 1812 led to considerable disaffection in New England, which culminated in the Hartford Convention (q.v.). The members of that body, however, afterwards denied that the subject of secession was broached in any form and its journal does not indicate any trace of such a discussion. In 1832 the nullification movement in South Carolina, provoked by dissatisfaction with the newly established protective tariff, seemed to threaten the stability of the Union. After this the history of secession is inextricably bound up with the question of slavery. During the next thirty years isolated threats of secession were frequently made in the South whenever Northern hostility appeared to imperil the interests of slavery. Nor did the idea entirely die out in New England, where at the time of the agitation over the annexation of Texas a number of anti-slavery Whig members of Congress, headed by John Quincy Adams, issued an address to their constituents declaring that annexation would fully justify a dissolution of the Union.

The question which brought the secession movement to a head related to the exclusion of

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slavery from the Territories. (See TERRITORIES.) In 1847, when the question began to assume an acute stage, Calhoun undertook to secure the co-operation of the slave States in a movement looking toward secession, but the plan failed. The enactment of the so-called Compromise Measures of 1850 (q.v.) again raised the question, but in one or two Southern States, where it was made an issue, the secessionists were defeated. Then came the passage in some of the Northern States of so-called personal liberty laws in contravention of the Fugitive Slave Law, the John Brown raid, and the election of President Lincoln, all of which intensified the feeling in the South in favor of withdrawal from the Union. In the South the right of secession was regarded as one of the reserved powers of the States, there being no prohibition in this respect in the Constitution nor any power conferred upon the Federal Government to compel a State to remain in the Union against its wishes. It is worthy of note that as late as 1860 many persons of prominence in the North, among them Horace Greeley, acknowledged the right of secession, only insisting that the step should be taken "with the deliberation and gravity befitting so momentous an issue." The regular machinery by which the work of secession was accomplished was a State convention called by the Legislature or self-assembled, as in Texas. See CIVIL WAR; CONFEDERATE STATES OF AMERICA; and UNITED STATES, and authorities cited under those titles.

SECESSION, WAR OF. See CIVIL WAR IN AMERICA.

SECESSIONISTS. In modern German art, more especially in painting, the adherents of that tendency which, in subject, form, and coloring, deviated from traditional conceptions to such an extent as to result in the secession of the younger generation of artists from the older art unions, and in the arrangement of separate exhibitions by the Munich, Vienna, and Berlin 'Secessions' respectively.

SECHTER, sĕk'tĕr, SIMON (1788-1867). An Austrian music teacher and contrapuntist, born at Friedberg, Bohemia. In 1851 he became Court organist and professor of harmony and composition at the Vienna Conservatory. He wrote much church music, numerous fugues, pianoforte pieces, preludes, the burlesque opera *Ali Hitsch-Hatsch* (1844), a *Generalbass-Schule*, and songs. His greatest work is *Die Grundsätze der musikalischen Komposition* (1853-54), a most valuable musical treatise.

SECKENDORFF, zĕk'en-dôrf, FRIEDRICH HEINRICH, Count (1673-1763). A German field-marshal and diplomat. He was born at Königsberg, Franconia. He served successively, from 1693, in the English-Dutch and Imperial armies, rose to the rank of colonel, and fought with conspicuous bravery during the War of the Spanish Succession. From 1709 in the service of Augustus II. of Poland and Saxony, he operated in Flanders (1710-11) and attended the peace negotiations at The Hague. Made lieutenant-general after suppressing an uprising of the Poles in 1713, he took part in the siege of Stralsund by the Prussians (1715). Appointed lieutenant-field-marshal by Emperor Charles VI., in 1717, he fought at Belgrade, and in 1718 in Sicily, and was raised to the dignity of count of the Empire. In 1721 he became Governor of Leipzig, but also remained in the Imperial service, was made Feldzeugmeister in 1723, and sent as Ambassador to Berlin in 1726. Obtaining leave to join the army on the Rhine, in 1734, he again rendered important services, and, although greatly hampered by the inactivity of Prince Leopold of Anhalt-Dessau, signally defeated the French at Klausen, October 20, 1735. He was sent to Hungary in 1737 as field-marshal to command the Imperial forces against the Turks. Victorious at first, he was blamed for the unsuccessful progress of the campaign, was recalled to Vienna, tried, and was kept in durance at Gratz until November, 1740, when the investigation was suspended. In 1741 he resigned his offices and, transferring his allegiance to Bavaria, rendered valuable services to Emperor Charles VII. during the War of the Austrian Succession. On the election of Emperor Francis I. Seckendorff obtained from Maria Theresa his reinstatement into all his former offices. In December, 1758, Frederick II., who bore him a grudge for the advice given to Austria, had him kidnapped by a detail of thirty hussars, while he was at church, and kept him in custody at Magdeburg until May, 1759. Seckendorff died at Meuselwitz, November 23, 1763.

SECKENDORFF, GUSTAV ANTON, Baron (1775-1823). A German writer, born at Meuselwitz. After studying at Leipzig, Freiburg, and Wittenberg, he traveled for two years in the United States (1796-98). He chiefly devoted himself, however, to recitations and lectures on æsthetics, which he delivered under the pseudonym of Patrick Peale, and to literature. In 1814 he was appointed professor at the Carolinum in Brunswick, but in 1821 went again to America and died in poverty at Alexandria, Louisiana. His works include the tragedies *Otto III.* (1805) and *Orsina* (1816), a sequel to Lessing's *Emilia Galotti; Kritik der Kunst* (1812); and *Beiträge zur Philosophie des Herzens* (1814).

SECKENDORFF, VEIT LUDWIG VON (1626-92). A German statesman and historian, born at Herzogenaurach, near Erlangen. Upon leaving the University of Strassburg he entered the service of his patron, Ernst the Pious, Duke of Gotha, rose to the post of privy councilor and chancellor, and brought about important reforms in the ducal territories. In 1664 he became chancellor to Duke Moritz of Saxony-Zeitz, after whose death in 1681 Seckendorff retired to his estate at Meuselwitz. Called to Berlin, in 1691, by the Elector Frederick III. of Brandenburg, to adjust certain sectarian difficulties, he was rewarded with the appointment as chancellor of the newly established university at Halle. A distinguished student of political science and the foremost Protestant Church historian of his time, he published *Der deutsche Fürstenstaat* (1655), for a long time the standard work of its kind at the German universities; *Der Christenstaat* (1685); and, most important of all, the *Commentarius Historicus et Apologeticus de Lutheranismo* (1688), a documentary refutation of Maimbourg's *Histoire du Luthéranisme.*

SECOND. For musical usage, see INTERVAL; for mathematical, see CIRCLE.

SECOND ADVENT OF CHRIST. The return of Jesus Christ in visible form to earth. On the basis of certain sayings of Jesus, the early

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Church expected that within a comparatively short period after His ascension He would again come and usher in the full glory of the Messianic Age. The passages in the Gospels containing these sayings are: (1) Mark vi. 1-11 = Matt. ix. 35-x. 16 = Luke ix. 1-5; (2) Mark ix. 1 = Matt. xvi. 28 = Luke ix. 27; (3) Mark xiii. = Matt. xxiv. = Luke xxi.; (4) Mark xiv. 62 = Luke xxii. 69 = Matt. xxvi. 64; (5) Luke xvii. 20-xviii. 18. A critical examination of these passages reveals the fact that sayings of Jesus which in one Gospel are of a broad, general character are reported in another Gospel in a much more precise and specific form: e.g. Mark ix. 1, "Who shall not taste of death until they see the *Kingdom of God* come," becomes in Matt. xvi. 28, "Who shall not taste of death until they see the *Son of Man* coming in His *Kingdom*." This tendency manifested itself almost immediately after His departure, though He had warned against speculation on such points (cf. Acts i. 6-7). It appears in the first formulation of Christian doctrine by Peter in the Pentecost sermon in the use of Old Testament expressions (Acts ii. 20, 35) and more plainly in the words reported in Acts iii. 20-21. The highly figurative language of the Old Testament already employed by Jesus in His eschatological discourses, taken in a literal sense, was of great influence in this respect. As the years passed, the more enlightened leaders of the Church came to feel that the true meaning of Jesus' words and realization of His promises was to be found in the eternal, spiritual heavenly life (compare I. Peter with the sermon of Peter in Acts; cf. Paul in I. Cor. xv.; also the Gospel of John) rather than in a material, earthly kingdom. But the doctrine of the *Parousia*, or second coming of Jesus in a comparatively short time, was by no means given up. It continued to wield great influence on Christian thought and retained its place in the general eschatological conceptions, as the great event which was to usher in a new era—the full manifestation of the Messianic Age. The practical consequences of such conceptions were sometimes serious and necessitated wise and cautious treatment (cf. II. Thess.; II. Peter iii. 1-13).

In later times the doctrine has been held in two forms: the Second Advent of Christ will be either (1) premillennial, i.e., before the age of the great prosperity and triumph of the Church; or (2) postmillennial, after this age and immediately before the general judgment. The former view is advocated upon the ground of certain interpretations of Rev. xx. 4-7, supported by other passages of Scripture, and more particularly by the general conception, thought to be derived from the Scriptures, that the present dispensation does not contain in it, under the plan of God, the means necessary to bring the world to Christ. Hence it will be necessary that Christ, the King, shall Himself come to take the government upon His shoulder and introduce the universal sway of His power. This view is held by an active school of evangelists, by many individual Christians in all communions, and by many who have united into separate denominations, such as the "Seventh Day Adventists." The other view regards the exegesis of the premillennialists as unsound, and their views of the present condition and tendencies of things as pessimistic; bases its conception of the gradual spread and final triumph of the Gospel upon the definite promises of the word and the analogies of God's methods everywhere else in Providence; and urges for its connection of the Second Advent with the Judgment, the unmistakable meaning of every plain passage of Scripture. See ADVENTISTS; ESCHATOLOGY; JUDGMENT, FINAL; MILLENNIUM.

SECONDARY QUALITIES. All the attributes of an object of perception which were supposed to be due to any peculiarity of the sense-constitution of the percipient; over against secondary qualities were placed primary qualities (q.v), which were supposed to be apprehended by the percipient as they are in themselves. Thus, color was called a secondary quality, while extension was called primary, because it was supposed that the human eye gave the characteristic of color to the object, while the spatial character of the object was regarded as original. This distinction has played a great part in the philosophy of the last three centuries, but cannot be considered ultimate. See KNOWLEDGE, THEORY OF.

SECONDARY SCHOOLS. A term applied to high schools, academies, and other schools which prepare pupils for college courses, or give instruction of the same general grade as that required for college preparation. The public school in England, the Lycée in France, and the Gymnasium and Realschule in Germany, give instruction corresponding to that of the secondary schools in the United States. In the latter part of the nineteenth century American secondary schools, especially the free high schools, became less distinctively schools for college preparation, and more and more 'finishing schools'—i.e. schools giving a general preparation for business life or for professional education, without consideration of college training. In this connection manual training, modern languages, and elementary science were introduced, and the old classical disciplines cut short or rendered optional. The broadening of college courses, however, and especially the spread of the elective and accrediting systems, rendered the transition from secondary schools to colleges easy even under the new conditions; accordingly these schools are still the chief institutions for college preparation, as they are the chief sources for training supplementary to that given in elementary schools. See ACADEMY; HIGH SCHOOL; NATIONAL EDUCATION, SYSTEMS OF; PUBLIC SCHOOLS.

SECOND SIGHT. A supposed faculty of 'internal' sight, whereby persons see distant occurrences or foresee future events; it is so called because, for the time, it takes the place of normal sight. Recently this power has been claimed by those who profess clairvoyance (q.v.). Historically, second sight is of interest because of the deeply rooted belief in its reality prevalent in Northern Europe among the Celtic population generally, and especially in the Hebrides and Scottish Highlands. Some of the Scottish seers asserted their power to impart the gift by teaching; others declared it to be hereditary. It was often believed that children, horses, and cows, as well as men, were affected with the visions. The most commonplace and trifling matters were revealed and predicted, coming events being fore-

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told by the appearance of characteristic omens. Consult: Boswell, *Life of Johnson*, ed. by Birbeck Hill (Oxford, 1887); Martin, "Western Islands of Scotland," and Pennant, "A Tour in Scotland," in Pinkerton, *Voyages and Travels* (London, 1809); Crowe, *The Night Side of Nature* (2d ed., ib., 1854); Tylor, *Primitive Culture* (ib., 1871); Dyer, *The Ghost World* (Philadelphia, 1893); Lang, *Cock Lane and Common Sense* (London, 1894).

SECRET (OF., Fr. *secret*, from Lat. *secretus*, secret, separated, p. p. of *secernere*, to separate, from *se-*, apart + *cernere*, to separate). One of the prayers of the mass of the same general form as the collect, but recited by the priest in so low a voice as not to be heard by the people, whence the name *secreta* is derived. It follows immediately after the oblation of the eucharistic bread and wine, and was in the earlier ages the only prayer of oblation provided in the missal; the Sacramentary of Saint Gregory calls it the *Oratio super oblata*.

SECRÉTAN, se-krā'tăn', CHARLES (1815-95). A Swiss metaphysician, born at Lausanne. He was a pupil of Vinet at Bâle in 1835, and of Schelling in 1837. In the latter year he founded the *Revue Suisse*, and in 1838 was appointed professor of philosophy at the University of Lausanne. The work of Secrétan, at once a philosopher and a theologian, was one of the most interesting attempts that have been made to reconcile the dogmas of Christianity with the principles of philosophy. The system of Secrétan, evolved from that of Descartes, is best set forth in his principal book, *La Philosophie de la liberté* (2 vols., 1848-49). Other works are *La philosophie de Leibnitz* (1840), *La raison et le christianisme* (1863), and *La civilisation et la croyance* (1887.)

SECRETARY. In the Federal Government of the United States, the head of an executive department and a member of the President's Cabinet. See the articles on the various departments, as STATE, DEPARTMENT OF, etc.

SECRETARY BIRD, or SERPENT-EAGLE. A remarkable raptorial bird (*Serpentarius secretarius*) of South Africa, the sole representative of a separate family (Serpentariidæ), classified between the turkey-buzzards and the true vultures. It is about four feet long, and has very long, unfeathered legs; the plumage is bluish gray, and there is an erectile crest of single feathers, suggesting quill pens carried above the ears. It feeds on reptiles of all kinds, which it devours in great numbers, and is so highly valued, on account of the constant war which it wages against serpents, that a fine is inflicted in Cape Colony for shooting it. It fearlessly attacks the most venomous serpents, stunning them with blows of its knobbed wings or feet, or seizing and carrying them into the air so high that they are killed when let fall. Small serpents are swallowed entire; the larger ones are torn to pieces. The secretary is most frequently seen in pairs, or solitary. It is tamed as a protector of poultry-yards, but if not sufficiently fed is apt to help itself to a chicken or duckling. It constructs a huge nest in trees, and occupies it year after year. Consult Evans, *Birds* (London, 1900); Newton, *Dictionary of Birds* (London, 1893-96).

SECRETARY OF STATE. An ancient office of importance in the Government of the United Kingdom. The first authentic record of its existence is in the reign of Henry III., when John Maunsell is described as "secretarius noster." Two secretaries were first appointed toward the close of the reign of Henry VIII. At the union of 1707 Anne added a third secretary of State for Scotland, but this office was soon abolished. In the reign of George III. there were at first two secretaries; and for a time, until 1782, a third for America. The two secretaries directed home affairs; to one the foreign affairs of the northern department were committed; to the other those of the southern department. Irish affairs belonged to the province of the elder secretary. There are now in the United Kingdom five principal secretaries of State, who are respectively appointed for home affairs, foreign affairs, war, the colonies, and India. They are always members of the Privy Council and of the Cabinet. For the American Secretary of State, see STATE, DEPARTMENT OF.

SECRET ASSOCIATIONS. Societies which admit members by an initiation and subscription to an oath, and often possess an elaborate ritual leading to higher degrees, with the use of symbols, pass-words, and grips as a means of recognition among members.

Many secret societies are found on the west coast of Africa. Among the Polynesians societies which unite large numbers of freemen in a freemasonry of common interest virtually control the economic and the political life. (See DUK-DUK.) The associations of priests that conducted the mysteries of the ancient religions are counted as the forerunners of later societies. The secrecy was due to one or both of two causes: (1) The tendency to hide all knowledge of life in mystical forms, away from the contamination of the vulgar, and to keep the multitude under the sway of superstition; or (2) the danger of maintaining such advanced ideas in the face of ignorance and prejudice. The political element entered at a very early date. The Pythagoreans combined philosophy and politics. The East was a fertile territory for secret societies. The Ismaili and afterwards the Assassins (q.v.) were organized in behalf of the claims of Ali's successor to the throne of the caliphate. It is customary among many Protestants to consider the Jesuits as a secret society in spite of their relation to the Church, but the notion is based upon a misapprehension. Secrecy and strange ceremonials often accompanied gatherings of the Middle Ages that first speculated on religion and science. The Secret Tribunals of Westphalia (the Vehmgerichte) and the Beati Paoli of Sicily were constituted to administer justice in an age of anarchy. On the other hand, there were certain criminal associations of brigands who levied tribute upon the people, best known of which is the Mafia (q.v.). With the awakening of modern thought secret societies were formed with speculative tendencies. The Rosicrucians (q.v.) mingled mysticism and occultism. The Illuminati sought social amelioration and were a source of republican propagandism. In the nineteenth century secret political societies have taken part in nearly every revolution. (See CARBONARI; HETÆRIA PHILIKE; FENIAN SOCIETY; NIHILISM.) China is honeycombed with secret societies, many

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of which have existed from very ancient times. (For the rôle played by the Boxers in the uprising of 1900, see CHINESE EMPIRE.) Many societies are ostensibly philanthropic, and some are purely benevolent, providing for marriage, burial, and business loans. In the United States there are many secret societies, in which, however, the fraternal element largely predominates. See SOCIETIES.

Consult: Heckthorne, *Secret Societies of All Ages* (London, 1899), which contains a bibliography.

SECRETION (Lat. *secretio*, separation, from *secretus*, secret, separate). A physiological process by which certain materials are separated from the blood to form new substances called secretions, through the agency of certain highly specialized cells. These materials are of two kinds: *true secretions*, which have some definite function to perform in the animal economy, and *excretions*, which are discharged from the body as useless or injurious. Secretions are further distinguished by the fact that they do not exist already formed in the blood, but require for their production special cells and a process of elaboration; while excretions are merely abstracted from the blood in the same form in which they already occur in that fluid. Both secretion and excretion contribute to health and nutrition, the one by performing some positive function, as aiding digestion, the other negatively by freeing the body of the products of destructive metabolism, which if retained would cause disease.

Secretion is performed by the following organs: The serous and synovial membranes; the mucous membranes, with their special glands, buccal, gastric, and intestinal; the salivary glands and pancreas; the mammary glands; the liver; the lachrymal glands; the kidneys and skin; and the testes. Secretion takes place by two different processes, the one physical and the other chemical. The physical processes are those of filtration and dialysis; the chemical process is one of true secretion. Both processes are employed in the secretion of the urine; the former within the Malpighian bodies and the latter in the *tubuli uriniferi*. (See KIDNEYS.) The simplest form of secretion is that of the serous and synovial membranes, the pleuræ, the pericardium, peritoneum, and the lining of the joints. These are lubricated by a fluid transuded directly through the flat endothelial cells lining these membranes from the blood vessels beneath them. A somewhat more elaborate process is that of the mucous membranes lining the respiratory and gastro-intestinal tracts. Thousands of cylindrical recesses, known as tubules, paved with secreting cells, empty their peculiar secretions upon every square inch of these surfaces. An isolated group of such tubules emptying by a single duct is called a simple gland; several of such groups having a common single duct constitute a compound gland; and the larger glands are simply multiplications of these groups, and serve to increase the amount of secreting surface within a given space. For a description of the manner in which cells are arranged in the various glandular structures, see GLANDS; KIDNEY; LIVER; MUCOUS MEMBRANES; etc. The characters of the various secretions, among which may be mentioned saliva, gastric juice, pancreatic juice, bile, ordinary mucus, sweat, tears, urine, the products of the serous and synovial membranes and the sebaceous glands, are described under their own names or those of the organs which produce them.

SECRETION. The process in plants by which a substance is formed and expelled from a cell, or the substance which is so formed. The term is usually restricted to the formation of the many and diverse special materials, such as enzymes, resins, volatile oils, and sugars, which are of service to the plant. Secretions are either poured out upon the surface or into internal receptacles. See GLAND.

The formation of the secretion may be either direct or through the production of an intermediate substance. The details of the elaboration, however, are still obscure. For example, sugar is supposed to be formed directly, whereas enzymes are usually preceded by the production of minute granules of zymogen in the protoplasm. This distinction may mean only that in some cases visible products precede the final one, while in others they do not. There are two modes of separation of the secretion from the protoplasm. In the first the cell wall remains intact and the secretion is either expelled through the permeable parts of the wall, and appears first in its proper nature beneath the impermeable cuticle, which it lifts into a blister, or through these permeable parts into an intercellular receptacle. No satisfactory explanation of the process has been found. Such glands may secrete once only, or repeatedly, or continuously. In the second method the secretion results from the disorganization of the protoplasm which it eventually replaces. In multicellular glands the cell walls disappear and after one secretion the glands perish. If the secretion be soluble in water, e.g. sugar, as in many nectaries, and by exposure to the air the solution becomes concentrated, its osmotic pressure (see OSMOSIS) may be so increased that it withdraws water from the cell. Nectar is thus kept fluid and ready for the insects which it attracts.

SECRET SERVICE. The name given to that department of a government whose business it is to detect crime and fraud, obtain information of various kinds, and render various services of a secret nature. Its duties are generally not defined, and vary with the necessities of the occasion which may create them. In the United States the service is not centralized as it is under most foreign governments, and each executive department employs men to detect specific classes of offenders against the laws. The name has come to be generally applied to the Secret Service Division of the Treasury Department, organized in 1864 and charged chiefly with the detection and arrest of counterfeiters, the whole country being divided into 27 secret service districts. Operatives from the division, however, are frequently detailed to work in connection with other departments than the Treasury Department. Thus during the Spanish-American War secret service operatives rendered effective services in breaking up the Spanish secret service organization in the United States. The Treasury Department also employs men to detect infractions of revenue laws and bring offenders to justice. The War Department employs men to obtain information of various kinds, and within the Post Office Department there is an efficient division of

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Post Office Inspectors and Mail Depredations, organized in 1872.

SECTION (Lat. *sectio*, from *secare*, to cut). In architecture, the delineation of buildings on a vertical plane through any part of them—as a *plan* is the horizontal projection.

SECTOR (Lat. *sector*, cutter, from *secare*, to cut). An instrument used in mathematical drawing and calculations, which consists of two strips of wood, ivory, or metal jointed together like a carpenter's foot rule. The centre of the joint must always be the vertex of the angle whose sides are formed by the inner edges and any of the corresponding pairs of lines drawn from the joint obliquely along the rule. These oblique lines are graduated in different ways, so as to give, on each limb, a line of equal parts, a scale of chords, scales of sines, tangents, and secants, a line of polygons, etc. (all of which are graduated from the centre of the hinge, which is their zero point), besides a number of common scales on the blank portions of the sector. The special use of this instrument is in the finding of a fourth proportional to three given quantities. This instrument becomes more inaccurate as the angle formed by the limbs increases. The sector is said to have been invented by Guido Ubaldi about 1568, though Gasper Mordente of Antwerp describes it in 1584, and attributes its invention to his brother Fabricus in 1554. It was described by several German and English writers in the same century, and again by Galileo, who claimed to have invented it in 1604.

SECTOR. In geometry, a portion of a circle (q.v.) included between two radii and the intercepted arc of the circumference. Its area is expressed by one-half of the product of the length of the arc and the radius of the circle.

SECULAR GAMES (Lat. *ludi sæculares*). Roman games deriving their name from the theory that their performance marked the close of a *sæculum*, or period of extreme duration of human life. This was reckoned as 100 years, or, after the time of Augustus, 110. These celebrations were usually instituted as purifications or to check some evil, the belief being that with the declaration of a new age a limit was set which the evil could not pass. The earliest celebration of which we hear occurred during the great plague of B.C. 463, and at this time the ceremony consisted in driving a nail in the wall of the Temple of Jupiter on the Capitol, apparently to symbolize the securing and destruction of the plague. This was repeated in the years 363 and 263. Soon after this the distress of the First Punic War led to the consultation of the Sibylline Books, and in B.C. 249 a new *sæculum* began with the performance of *ludi Tarentini* at a spot in the Campus Martius called Tarentum. The celebration occupied three nights and on each a black bull and a black cow were offered at a subterranean altar, uncovered for the occasion, to Dis Pater and Proserpina, the Greek gods of the Lower World, whose worship was thus introduced to Rome. It obviously is essentially a funeral ceremony for the age that is past. The rite was repeated in B.C. 146, but the civil wars seem to have prevented the next repetition, and in B.C. 17 Augustus celebrated new and splendid *ludi sæculares*, which marked the opening of a new era, and which are known to us from the official record discovered in 1891. The old nocturnal offerings were continued at the old altar, but the deities honored were now the Fates, Eileithyia, helper in childbirth, and the Earth. Three days were also given up to splendid processions and offerings in honor of Jupiter Optimus Maximus, Juno Regina, and Apollo and Artemis of the Palatine. On the third day the procession moved from the Palatine to the Capitol and back, led by a chorus of 27 youths and as many maidens, who sang the *Carmen Sæculare* of Horace. These games were repeated in A.D. 88 by Domitian, and in A.D. 204 by Septimius Severus. Another series in celebration of the foundation of the city was begun A.D. 47 (800 A.U.C.), and repeated in 147 and 248. Consult: Wissowa, "Religion und Kultus der Römer," in Müller's *Handbuch der klassischen Altertumswissenschaft* (Munich, 1902); and *Die Säcularfeier des Augustus* (Marburg, 1894).

SECULARISM (from *secular*, from Lat. *secularis, sæcularis*, relating to an age or period, worldly, from *seculum, sæculum*, age, period, world). The term applied to a system of ethical and social principles first advocated about 1846 by G. J. Holyoake. As it names implies, it concentrates its attention upon the present life, neither denying nor affirming the existence of another. It inculcates an ethics not dependent in any way on religion, although it does not formally deny the truth of any religion. It is, in fact, utilitarianism cut loose from all connection with theology. A society was formed in London, of which Holyoake was president, but in 1858 Charles Bradlaugh (q.v.) succeeded him and under his administration the society carried on a political propaganda, advocating disestablishment and disendowment of the Church of England, abolition of the House of Lords, and many economic changes. Consult Holyoake, *Principles of Secularism* (London, 1855).

SECULAR VARIATION. See MAGNETISM, TERRESTRIAL.

SECUNDERABAD, sē-kŭn'dēr-ä-bäd'. A suburb and military cantonment of Hyderabad (q.v.), Nizam's Dominions, India.

SECUN'DUS, JOANNES (1511-36). A Dutch poet, Jan Nicolai Everaerts by name. He was born at The Hague and was educated for the law in Bourges, but devoted himself to poetry, painting, and sculpture. In 1533 he went to Toledo as secretary to the Cardinal Archbishop Tavera. After his death was published *Basia*, a collection of Latin love poems distinguished by their classic beauty. His elegies, odes, epistles, and epigrams were collected in 1541 under the title of *Opera Poetica*.

SECURITY (Lat. *securitas*, freedom from care, from *securus*, free from care, from *se-*, apart + *cura*, care, anxiety). Instruments or property which, in contemplation of law, render the enjoyment or enforcement of a right more secure. *A personal security* is a promise or obligation, such as a negotiable instrument or a bond given by a debtor or by a third person, in addition to the original liability intended to be secured. Even when a debtor gives his own promissory note or check or bill of exchange for the debt, this new engagement is properly spoken of as a security, because his liability thereon is more easily proved than on the original debt. *A security on property* exists when the property is mortgaged or pledged to

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secure a debt or liability, or when by a rule of law the creditor is entitled to hold the property until a particular liability to him is discharged.

Securities are ordinarily *specific;* but at times they are *shifting* or *floating.* An example of the latter class is afforded by a chattel mortgage on property thereafter to be acquired by the mortgagor, or by corporation debentures which are made a charge on the stock in trade and book debts of the corporation. As soon as the mortgagee or debenture holder takes possession of the property or institutes proper proceedings for the enforcement of his rights the security becomes specific. Securities may originate either in the agreement of parties, which is the more common case, or in a rule of law. The seller's lien is of the latter class. This has its origin in the law merchant (q.v.), which accords to the unpaid seller of goods the right, in certain cases, even after title has passed to the buyer, to retain possession until the price is paid.

Under State laws exempting 'public securities' from taxation it has been held that this term does not include the bonds of railroads and similar corporations, but is limited to securities issued under legislative sanction for the furtherance of public works.

Securities in judicial proceedings are of various kinds, but their purposes and form are generally regulated by statutes which should be examined in each jurisdiction. Consult: Jones, *A Treatise on the Law of Corporate Bonds and Mortgages* (Bonton, 1890); Poor, *Handbook of Investment Securities* (New York, 1892); Hainer, *The Modern Law of Municipal Securities* (Indianapolis, 1898); Butterworth, *Bankers' Advances on Mercantile Securities* (London, 1902).

SECURITY OF PERSON. One of the fundamental rights of persons recognized and enforced by the common law and now guaranteed by the United States Constitution and by the constitutions of most of the States. It comprises those personal rights and privileges and immunities which go to make up the Bill of Rights under the English Constitution and which became fundamental in the American colonies. Many of these are traceable to *Magna Charta,* and they were confirmed and their number added to by the Petition of Right (Charles I.), and by the Bill of Rights of the Revolution of 1688.

The following is an enumeration of the more important rights of personal security: That no one shall be required to answer for an infamous crime unless he shall have been charged with the commission of the crime by a presentment or indictment of the grand jury; that no person shall be liable for the same offense to be twice placed in jeopardy of life or limb; that one charged with the commission of a crime shall not be compelled to be a witness against himself; that he shall be entitled to trial by jury and at the trial that he shall be confronted with the witness against him; that he shall be entitled to have compulsory process to compel the attendance at the trial and the testimony of witnesses in his favor; that excessive bail shall not be required of him, and that cruel and unusual punishments shall not be imposed; that no bill of attainder or *ex post-facto* law shall be passed; and that no person shall be deprived of life, liberty, or property without due process of law.

For a fuller discussion of the subject, see CONSTITUTIONAL LAW; PRIVILEGE; MAGNA CHARTA; PETITION OF RIGHTS; BILL OF RIGHTS; JEOPARDY; BAIL; ATTAINDER; etc.

SEDAINE, se-dân', MICHEL JEAN (1719-97). A French dramatist, born in Paris, the son of an architect. Sedaine was early orphaned. He became a mason and builder, and in 1753 published poems of merit. Then he turned to the stage, attracted the notice of Diderot, and won general applause by the now classic *Le philosophe sans le savoir* (1765), and *La gageure imprévue* (1768), natural and original bourgeois comedies which alone survive of his work. He became an Academician, and secretary for architecture in the division of fine arts, and died in Paris, prosperous, popular, and respected. His *Œuvres choisies* were published in three volumes in 1813.

SEDALIA, sê-dā'lĭ-à. The county-seat of Pettis County, Mo., 188 miles west of Saint Louis, on the Missouri Pacific, the Missouri, Kansas and Texas, and the Sedalia, Warsaw and Southwestern railroads (Map: Missouri, C 3). It has an elevated site in a rolling prairie region, and is regularly laid out with beautifully shaded streets. Leading features are the George R. Smith College (colored), the Convent School of the Sisters of Saint Joseph, the Carnegie Public Library, the hospital of the Missouri, Kansas and Texas Railroad, and Liberty and Forest parks. The State fair is held in Sedalia. The city has important railroading and manufacturing interests. Shops of the Missouri Pacific and the Missouri, Kansas and Texas railroads are here; and there are also iron works, foundries, beef and pork packing establishments, breweries, flour and woolen mills, and manufactories of shoes, carriages, overalls, and hosiery. The government, under the revised charter of 1893, is vested in a mayor, elected biennially, and a unicameral council. Founded by Gen. G. R. Smith in 1861, Sedalia was used as a United States military station during the Civil War. It was captured and held for several days by a Confederate force in 1864. Sedalia was incorporated in 1864 and was chartered as a city in 1889. Population, in 1890, 14,068; in 1900, 15,231.

SEDAN, se-dăn'. The capital of an arrondissement in the Department of Ardennes, France, 164 miles northeast of Paris, on the Meuse River (Map: France, M 2). It was formerly an important fortified town, and the scene, in 1870, of the disastrous defeat and capitulation of the French army of MacMahon. (See SEDAN, BATTLE OF.) The fortifications have been demolished and Sedan at present is mainly a residential and industrial town. The chief buildings are the parish church, the college, and the museum, and there are interesting remains of the fifteenth-century castle. The town is noted for its manufactures of cloth, introduced by Colbert in 1646, and there are also considerable coal and iron mining interests in the vicinity. Sedan chairs are said to have been first made here. Population, in 1901, 19,349.

SEDAN, BATTLE OF. In the latter part of August, 1870, Marshal MacMahon set out from Chalons for the purpose of effecting the relief of Metz, where Bazaine (q.v.) had been locked up by the German forces, after the series of engagements terminating with the battle of Gravelotte (q.v.). The third and fourth German armies, by forced marches, succeeded in barring to MacMa-

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hon the way to Metz, and pressed the French northward toward the Belgian frontier, which it was a part of the German plan to compel them to cross. MacMahon, however, after several days' fighting chose the alternative of throwing himself into the fortress of Sedan, and occupied the heights which surrounded the fortress on the east, north, and west. The Germans now proceeded to encircle the French forces, whom they outnumbered two to one. The battle began early on the morning of the first of September. While the Württemberg troops were assigned to hold the line of French retreat to Mézières, the Bavarians, Prussians, and Saxons, with the Guard, delivered an attack along the entire French line. MacMahon was wounded in the first hours of fighting, and to the conflict of authority between Generals Ducrot and Wimpffen was due no little of the confusion which followed. The most desperate fighting occurred at the village of Bazeilles, to the east of Sedan. In the late afternoon the French had been driven from their positions, and the Germans had planted on the heights around Sedan a circle of 500 cannon, under whose fire the enemy was helpless. The French were driven back on Sedan, and at four o'clock the bombardment of the town began. The futility of resistance was apparent, and by order of the Emperor Napoleon III., who was present in Sedan, a flag of truce was raised. On September 2d General Wimpffen arranged with Bismarck and Moltke the terms of capitulation. Nearly 2,900 officers and 83,000 men laid down their arms and were made prisoners, with the Emperor. The French loss in battle was 17,000 dead and wounded and 21,000 prisoners. Three thousand men succeeded in escaping into Belgium. The German loss comprised 470 officers and 8500 men killed and wounded. In Paris the news of the capitulation of Sedan led to the overthrow of the Second Empire.

SEDATIVES (OF. *sedatif*, Fr. *sédatif*, from Lat. *sedare*, to calm, causative of *sedere*, to sit). Agents which exert a quieting influence upon the system or any part of it either by diminishing pain or excitability or by lessening functional activity. Sedatives may have a general or local action. General sedatives include chloroform, ether, and the hypnotics (q.v.), such as chloral. Local sedatives are cold, heat, cocaine, opium, aconite, etc. Typical respiratory sedatives are dilute hydrocyanic acid, squills, ipecac, and veratrine. Digitalis, aconite, and tobacco are circulatory sedatives. Among the drugs which have a soothing effect upon the nerves and spinal centres are potassium and sodium bromides, gelsemium, and physostigmine. Stomachic sedatives comprise sodium bicarbonate, bismuth, and nitrate of silver. Certain drugs are sedative to one organ or system and irritant to another, or they may be sedative in minute doses and irritant in large; any classification, therefore, is apt to be misleading. See also NARCOTICS; HYPNOTICS; ANÆSTHETICS.

SED'DON, JAMES ALEXANDER (1815-80). An American jurist and politician, born at Falmouth, Stafford County, Va. He studied law at the University of Virginia, and began practice in Richmond. In February, 1861, he was a delegate to the Peace Convention held in Washington, and presented a minority report recommending the adoption of amendments to the Constitution suggested by J. J. Crittenden, which tolerated slavery in the Territories, and specifically recognized the right of peaceable secession. He was a member of the First Confederate Congress, and on November 21, 1862, was appointed Secretary of War by President Davis. On the expression by the Virginia Congressmen of a want of confidence in the Cabinet, he resigned in February, 1865. He then retired to his plantation in Goochland County, and lived quietly until his death.

SEDGE'MOOR. A barren tract of land in Somersetshire, England, between King's Weston and Bridgewater, 5 miles southeast of the latter place. It is noted as the battlefield where the Duke of Monmouth (q.v.) was defeated by the troops of James II., commanded by the Earl of Faversham, in 1685.

SEDGLEY, sĕj'lĭ. A manufacturing town in Staffordshire, England, suburban to Wolverhampton. Population, in 1901, 15,951.

SEDG'WICK, ADAM (1785-1873). An English geologist, born in Yorkshire. He was educated at Trinity College, Cambridge, and in 1818 became Woodwardian professor of geology in that university. In studying the rock formations of North Wales he developed a new stratigraphical group to which he gave the name Cambrian, and which is still recognized in geological nomenclature. With Murchison (q.v.) he established also the Devonian system and showed its extensive development in Europe. Besides numerous papers to scientific journals, he wrote: *Discourse of the Studies of the University of Cambridge* (1850); and *A Synopsis of the Classification of the Paleozoic Rocks* (1855). For an estimate of Sedgwick's scientific work, consult Geikie, *The Founders of Geology* (London, 1897).

SEDGWICK, CATHERINE MARIA (1789-1867). An American author, born in Stockbridge, Mass., and daughter of Judge Theodore Sedgwick. She opened a school for young ladies (1813), and continued it for fifty years. In 1822, with the encouragement of her brother, Theodore Sedgwick, she published *A New England Tale*, which was popular, and followed it in 1824 with *Redwood*. Then came a succession of novels, including the good colonial romance *Hope Leslie* (1827) and culminating in *The Linwoods* (1835), her last and best novel. The series of novels was succeeded by one of popular stories, illustrating morals and domestic economy. Her later work included *Letters from Abroad to Kindred at Home* (1841), the result of a European trip, and other moral books. Although now little read, she was an important force in early American culture. Consult *Life and Letters*, by Mary E. Dewey (1871).

SEDGWICK, DANIEL (1814-79). An English hymnologist. He was born in London, and was first a shoemaker, then a second-hand bookseller, and came to have many customers among collectors of theological literature. In 1859 he began to reprint rare hymns in his *Library of Spiritual Song*, and, continuing to study the subject, he became a recognized authority in hymnology. His knowledge was wide and minute, but he was hampered in making use of it by lack of education. He was much consulted by compilers of hymn books, and Julian's *Dictionary of Hymnology* owes much to his manuscripts.

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SEDGWICK, JOHN (1813-64). An American soldier, born at Cornwall, Conn. He graduated at West Point in 1837, saw active service in the second Seminole War, served with distinction in the Mexican War, and received the brevets of captain and major. On August 25, 1861, soon after the outbreak of the Civil War, he was promoted from lieutenant-colonel to colonel, and six days later received the command of a brigade. He served with great efficiency, as a division commander, in the Peninsular campaign, and at Antietam was twice wounded, but remained upon the field, in order to inspire his troops, for two hours after receiving the second wound. In December, 1862, he was appointed a major-general, and in February, 1863, was placed in command of the Sixth Army Corps. In Hooker's Chancellorsville campaign he captured Marye's Heights, near Fredericksburg, and after Hooker's defeat displayed great skill in withdrawing across the Rappahannock. When Lee invaded Pennsylvania, Sedgwick, by a remarkable forced march, succeeded in getting to the field of Gettysburg in time to take an important part in the last two days of the battle. In the following November he succeeded by a skillful manœuvre in capturing at the Rapidan 1500 men of General Early's divison, with several cannon and battle flags. He took part under General Grant in the battles of the Wilderness, but was killed on May 9, 1864, while superintending the planting of some guns in an advanced position at Spottsylvania. A monument made from the metal of cannon captured by his corps was erected in his honor at West Point in 1868.

SEDGWICK, ROBERT (c.1590-1656). An American colonist, born in Woburn, Bedfordshire, England. He settled at Charlestown, Mass., in 1635, where he became a successful merchant, and for many years represented that town in the General Court. He was active in organizing the Ancient and Honorable Artillery Company, of which he became captain in 1640. In 1652 he was appointed commander of all the Massachusetts militia. With John Winthrop, Jr., and other colonists he established in 1643-44 the first iron works in the United States. Under authority from Cromwell, he drove the French from the Penobscot region in 1654, and in 1655 accompanied the expedition which captured Jamaica. Just before his death there Cromwell promoted him major-general and gave him sole command.

SEDGWICK, THEODORE (1747-1818). An American jurist, born in Hartford, Conn. He attended Yale College, but left in 1765 without graduating. In the following year he was admitted to the bar, and practiced in Great Barrington in Massachusetts, and then in Sheffield. One of his most famous cases was that of Elizabeth Freeman, an escaped slave. The trial took place about the year 1781, and the court gave the woman her freedom on the ground that slavery was incompatible with the Massachusetts Bill of Rights. In 1776-77 Sedgwick served in the expedition against Canada as an aide to Gen. John Thomas; was later several times a member of the Massachusetts Legislature, and in 1785-86 was a member of the Continental Congress. In the following year he assisted in putting down Shays's Rebellion; in 1788 was Speaker of the Massachusetts House, and in the same year was a member of the Convention that ratified the Federal Constitution. From 1789 until 1801 he was a member of Congress, and for brief periods was Speaker of the House and president of the Senate. From 1802 until his death he was judge of the Massachusetts Supreme Court.

SEDGWICK, THEODORE (1811-59). An American law writer, born in Albany, N. Y. After graduating at Columbia College (1829) he was attached to the United States legation at Paris in 1833-34. In 1858 he became United States District Attorney. His writings include a *Treatise on the Measure of Damages* (1847; 8th ed. 1891), a work of much importance, and his edition of the political writings of William Leggett (2 vols., 1840).

SEDGWICK, WILLIAM THOMPSON (1855—). An American biologist, born in West Hartford, Conn., and educated at Sheffield Scientific School, Yale (1877), and at Johns Hopkins University, where from 1880 to 1883 he taught biology. In 1883 he became professor of biology in the Massachusetts Institute of Technology. Sedgwick was biologist to the State Board of Health of Massachusetts from 1888 to 1896. He collaborated on a *General Biology* (1886) and published *Principles of Sanitary Science* (1902).

SEDILLOT, *se-dē'yō'*, LOUIS PIERRE EUGÈNE AMÉLIE (1808-75). A French Orientalist, born in Paris. He was successively professor at various colleges, and in 1832 became secretary of the Collège de France, but was chiefly occupied in the study of science among the Orientals. His numerous monographs include: *Lettres sur quelques points de l'astronomie orientale* (1834); *Manuel de chronologie universelle* (1834; 2d ed. 1850); *Mémoires sur les systèmes géographiques des Grecs et des Arabes* (1842); *Matériaux pour servir à l'histoire comparée des sciences mathématiques chez les Grecs et les Orientaux* (1845-49); and *Histoire des Arabes* (1854).

SEDIMENTARY ROCKS (from *sediment*, Lat. *sedimentum*, subsidence, settling, from *sedere*, to sit). One of the main petrographic divisons, comprising all those rocks that are of secondary origin and have accumulated by the action of water or of the wind. See AQUEOUS ROCKS; ÆOLIAN ACCUMULATIONS.

SEDITION (Lat. *seditio*, from *se-*, *sed-*, apart + *ire*, to go). Conduct against the State or its authority tending toward treason, but lacking the overt act, which is regarded as essential part of the greater offense; the writing, publishing, or uttering words which tend to excite subjects or citizens to insurrection or otherwise to disturb the tranquillity of the State, but which do not amount to treason. See TREASON.

SEDITION LAWS. See ALIEN AND SEDITION ACTS.

SED'LEY, AMELIA. A gentle sentimental girl in Thackeray's *Vanity Fair*. She married Captain George Osborne, and after his death at Waterloo Colonel Dobbin.

SEDLEY, Sir CHARLES (1639-1701). An English dramatic poet. He was born at Aylesford, Kent, and was the posthumous son of Sir John Sedley, from whom he inherited his title. He was educated at Wadham College, Oxford, became a member of Parliament after the Restoration, and stood high in the favor of Charles II. As a young man he was of dissolute habits,

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and twice came under the ban of the law for riotous and indecent behavior. He supported the Revolution and opposed James II. on account of the latter's intrigue with his daughter, whom the King had made Countess of Dorchester. He was esteemed by his contemporaries for his wit, satire, and dramatic works, the chief of which are: *The Mulberry Garden*, a comedy (1668); *Antony and Cleopatra*, a tragedy (1677); *Bellamira, or The Mistress*, a comedy (1687); *Beauty the Conqueror, or The Death of Mark Antony*, a tragedy (1702); *The Grumbler*, a comedy (1702); and *The Tyrant King of Crete*, a tragedy (1702). Consult the *Memoir*, prefixed to his *Works* (London, 1778).

SEDUCTION (Lat. *seductio*, a leading astray, from *seducere*, to lead astray, from *se-*, apart + *ducere*, to lead). In law, in its broadest sense, the decoying or enticement of a servant away from his employment to his master's damage. By modern usage the term is generally, although not exclusively, applied to the persuasion of the servant to unlawful sexual intercourse with the seducer. Seduction by the common law was one of the numerous forms of tort for which the person injured might recover damage. The use of this form of action to recover for the loss of service of a servant, however, is now of infrequent occurrence. The action, however, is now important as affording a parent a means of recovery of damage from the seducer for unlawful intercourse with his daughter. For all practical purposes the effect of his action is to enable him to recover damage for the wrong done him as a parent, and the amount of his recovery is not limited to the actual financial loss. Historically and in legal contemplation, however, the parent's right to recover is based upon the loss of service of his daughter as a servant, and it seems not unlikely that originally the right to recover for seduction of a child did not differ in any particular from the right to recover for the enticement of a servant. To entitle the parent, therefore, to recover for the seduction of his daughter it was necessary for him to establish loss of the daughter's services as a consequence of the seduction. This is still the rule in England, but generally in the United States, by a relaxation of the rule, the parent may maintain the action if he has a legal right to the daughter's services during her minority, whether he is actually availing himself of them or not. This fact being established, however, he may recover not alone for loss of the daughter's services, but for the injury to his feelings and an additional amount as punitive damages.

In establishing loss of service or invasion of the parent's legal right to the daughter's services slight acts of service or a bare legal right to services will suffice. And whenever loss of such service or interference with the right follow as a direct result of the seduction, the seducer must respond in damages. At common law the person seduced had no right of action against the seducer, as the seduction was accomplished with the consent of the person seduced, and this was the rule even when the seduction was accomplished by fraud. In some States by statute the person seduced may maintain an action in her own right, although usually this may not be done unless a child is born as a consequence of the seduction, thus making the action analogous to a bastardy proceeding. Seduction was not a crime by the common law. Most of the States of the United States now have statutes making seduction of a woman of previous chaste character a crime. Generally they are applicable only to the seduction of unmarried women under promise of marriage, and subsequent marriage is not infrequently made a bar to prosecution for this offense. Consult authorities referred to under CRIMINAL LAW.

SEDU'LIUS, CÆLIUS. A Christian poet of the fifth century. He wrote *Carmen Paschale*, an extant hexameter poem, in five books, on the history of the Old Testament; *Opus Paschale*, a prose version of the work, which is also extant; *Abecedarius*, an alphabetical hymn to Christ in 23 quatrains of iambic dimeters, remarkable for the partial employment of rhyme as a musical element; and *Veteris et Novi Testamenti Collatio*, a comparison of the Old and New Testaments in 55 couplets of elegiacs. The best editions are by Arevalus (1794) and Hulmer (1885). Consult: Hulmer, *De Sedulii Poetæ Vita et Scriptis* (Vienna, 1878), and Leimbach, *Ueber den christlichen Dichter Sedulius* (Goslar, 1879).

SEE, HORACE (1835—). An American consulting engineer and naval architect, born in Philadelphia, Pa., where he was educated and after learning the machinist's trade became a mechanical engineer. In 1871 he entered the employ of William Cramp and Sons and in 1879 became their superintending engineer. He designed and in some cases supervised during manufacture and trial engines for the cruisers *Yorktown*, *Concord*, *Bennington*, *Philadelphia*, *Newark*, and *Vesuvius*, the steamship *Monmouth*, and other steamships and private yachts. In 1889 he removed to New York City and opened an office as a consulting engineer and architect. More than any other one man, perhaps, he advanced the use of the double-compound, triple, and quadruple expansion engines. His device for the manufacture of perfect bearings and crank shafts did away with heating these parts before using the engine, and his hydro-pneumatic ash-ejector discharging the ashes direct from the fireroom outside the vessel above the water line did away with dirt and noise and relieved the firemen of considerable work. He also introduced many improvements in the hull, as well as machinery, of steam vessels.

SEE, JOHN (1845—). A Premier of New South Wales. He was born in Huntingdonshire, England, and went as a boy to Australia. In 1880 he entered Parliament as a member from Grafton and afterwards occupied successively the offices of Postmaster-General for the Colony, Colonial Treasurer (1891-94), Minister of Defense (1899-1901), and Colonial Secretary and Premier, which post he assumed in 1902.

SEE, THOMAS JEFFERSON JACKSON (1866—). An American astronomer, born near Montgomery City, Mo. He was educated at the universities of Missouri and Berlin, receiving his doctor's degree at the latter institution (1892) and presenting as inaugural dissertation a research of striking merit into the origin of binary stars. In 1893-96 he assisted in the organization of the Yerkes Observatory. In 1896 he became astronomer at the Lowell Observatory, and in 1899 professor of mathematics in the United States Navy. While at the Lowell Observatory, he ex-

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amined about 200,000 fixed stars between 15° and 65° south declination, leading to the discovery of about 600 new double stars and remeasurement of about 1400. He has also made observations on the motions of satellites and diameters of the planets, measured parallax, and computed orbits of double stars. See is a fellow of the Royal Astronomical Society and member of several learned scientific societies. He wrote *Die Entwickelung der Doppelstern-Systeme* (1893), and *Researches on the Evolution of the Stellar Systems* (1896); he has also published double-star catalogues and contributed to various scientific journals.

SEEBACH, zā'bäg, Marie (1834-97). A German actress. She was born at Riga, the daughter of an actor, and studied at Cologne for the opera. Having come to Hamburg in 1852, she made a great success as Gretchen in Goethe's *Faust*, and in other rôles, till in 1854 she went to Vienna. In 1856-65 she was engaged at the Court Theatre in Hanover and in 1866 removed to Berlin with her husband, Albert Niemann, whom she had married in 1859, but from whom she separated in 1868. Henceforth she confined herself to starring tours until 1887, when she accepted an engagement at the Royal Theatre in Berlin. Her principal rôles besides Gretchen were Klärchen in *Egmont*, Louise in *Kabale und Liebe*, Julia, Ophelia, Desdemona, and Jane Eyre, and later Maria Stuart, the nurse in *Romeo and Juliet*, and Lady Macbeth. In 1871 she visited the United States. In 1893 she endowed a home for needy actors, which was established at Weimar as Marie-Seebach-Stiftung in 1895.

SEEBOHM, sē'bōm, Frederic (1833—). A British economic historian, born at Bradford. He was educated for the law, becoming a barrister, Middle Temple, in 1856. His *English Village Community*, published in 1883, at once placed him in the foremost rank of economic historians. Before the publication of that work the prevailing view was that primitive Anglo-Saxon society consisted of communal groups of free men holding land in common (the mark), and that by the continual aggression of native and foreign leaders the village community had degenerated into the manor, in which the tenants, originally free, became serfs. Seebohm attempted to show that there is no satisfactory ground for believing that the free community ever existed in England. The similarity of the Roman villa and the manor is emphasized, the implication being that the mediæval manor is to be explained as an amalgamation of the Roman villa with the Germanic tribal system. Seebohm published two works dealing with early tribal relations, *Tribal Custom in Anglo-Saxon Law* (1902) and *The Tribal System in Wales* (1895). His other works are: *Oxford Reformers, John Colet, Erasmus*, and *Thomas More* (1867; 3d revised ed. 1887); *On International Reform* (1871); *Era of the Protestant Revolution* (1874).

SEED (AS. *sæd*, OHG. *sāt*, Ger. *Saat*, seed, Goth. *manasēþs*, mankind, from AS. *sāwan*, Goth. *saian*, OHG. *sājan*, *sāwen*, *sāen*, Ger. *säen*, to sow; connected with Lat. *serere*, OChurch Slav. *sēti*, Lith. *seti*, Lett. *sēt*, to sow). A reproductive structure characteristic of the highest group of plants (seed-plants). All flowering plants produce seeds, but not all that produce seeds have flowers.

A seed is an ovule (q.v.) transformed by the changes following fertilization. The integuments of the ovule give rise to the hard, impervious covering (testa), which often furnishes characters by which species and genera may be recognized. In many cases it also gives rise to appendages, such as wings (trumpet creeper), and silky hair (milkweeds), which evidently aid in wind distribution. In others long threads (spiricles) are discharged from short hairs when the seeds are wetted. While the testa usually develops as a hard, dry coat, it is sometimes berry-like (peony), or even like a stony fruit (magnolia). There may also be appendages or outgrowths, as in the fumitory family, which have been called strophioles (at the base of the seed) and caruncles (at the apex). Sometimes an extra more or less incomplete seed-covering (aril) is developed, which is sometimes a membranous sac loosely inclosing the seed and open at the top (water lilies); but it is usually fleshy (yew, may-apple, bitter-sweet, etc.). One of the most peculiar arils is the so-called mace of the nutmeg.

Within the testa of a typical seed is a region (the nucellus) often still more extensively modified. In its centre a large cavity (embryo-sac) occurs within which the embryo is found, imbedded in nutritive tissue (endosperm). The tissue of the nucellus between the embryo-sac and the testa is called the perisperm, and supplements the nutritive supply of the endosperm. Examples of modification: The embryo-sac may enlarge and occupy the whole nucellar region, the perisperm being absent and the embryo-sac abutting against the testa. Again, the embryo may absorb the endosperm and store its own body with nutritive material. In the mature bean seed both these phenomena occur, the testa containing only a large embryo gorged with food.

In an ordinary dicotyledonous embryo the seed contains three regions: (1) the hypocotyl, or small stem-like structure, which should not be confused with the later stem of the plant; (2) two cotyledons, or the seed-leaves, usually very different in form from the later leaves; and (3) between the cotyledons, the plumule, a bud often very minute, which develops into stem and leaves. See Embryo.

Seeds contain various carbohydrate and proteid reserve foods, perhaps the most conspicuous among which in most seeds are starch (in cereals), oils (in castor bean), reserve cellulose (in the date). Proteid foods are also abundant; in some cereals they form a layer outside of the starch.

Many seeds, such as nuts, have no striking methods of dispersal, yet nut-bearing trees (e.g. oaks) are about as widely distributed as other trees. Many seeds, the so-called sling fruits, are scattered by mechanical expulsion, as touch-me-not (Impatiens). The commonest mechanical device for seed dispersal depends upon the desiccation and consequent rupture of the seed pod or capsule; in the Leguminosæ the pods twist and scatter the seeds. Many seeds are scattered by animals, either as so-called burrs, which become attached to animals, or as fleshy fruits which are eaten. Many seeds are distributed by wind. Some (elm, maple) have winged seeds; others have cottony or feathery appendages (dandelion, milkweed). Various tumble weeds (q.v.) may also be included in this group. In

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many cases water may carry seeds for great distances. See SPERMATOPHYTES.

SEEDEATER. A very small, variegated, and sometimes brightly colored finch or 'grass-quit' of the genus Sporophila, several species of which are found in tropical America, feeding mainly upon grass-seeds and the like, and are often familiar about gardens. One species, the black-faced (*Sporophila Moreletti*), extends north into Texas and is distinguished by having the head and fore parts mainly black. It nests near the ground and lays eggs of the colors shown in the Plate of EGGS OF SONG BIRDS.

SEED-PLANTS. The common name of the highest of the four great divisions of plants. See SPERMATOPHYTES.

SEED TESTING. The practice of determining the purity of seeds by visual examination and the viability by sprouting samples. The active crusade in seed testing may be said to have begun with Professor Nobbe, who established the first laboratory for testing seeds at Tharand, Saxony, in 1869, since when other laboratories have been established in most of the countries of Europe, and in some countries the quality of seed is a subject of governmental control. In the United States the seed-testing laboratories are in connection with the National Department of Agriculture and many of the State experiment stations. Legislation looking to seed control has been enacted by some of the States. The need for seed testing prior to sale is well shown by the repeated report of seed of low vitality, and often with admixtures of dead seed, sand, and weed seed. Many of the most troublesome weeds have been introduced in seeds purchased in good faith. Grass and clover seed are commonly mixed with similar seeds of less value. In countries where seed-control regulations exist samples of definite weight are sent to a testing laboratory where their value is determined and a certificate issued. Based upon this report, the dealer guarantees the quality of his seed. As the laboratory tests are generally made under the most favorable conditions, a certain amount of latitude is allowed, and certain penalties are exacted when the samples are inferior to the standard. This system appears to have given satisfaction where adopted, and the quality of seed in the market is much better than formerly. In testing for purity a definite portion is weighed out from an average sample and the whole carefully examined under a magnifying glass and all chaff, earth, etc., rejected. The weight of the remainder expressed in per cent. shows the purity. Of the pure seed a definite number—100 or 200—are germinated in specially devised apparatus. The sprouted seeds are counted every day and removed. This is continued from 10 to 30 days, dependent upon the kind of seed, some sprouting much faster than others. At the end of the period, which is fixed for every kind of seed, the number of sprouted seeds expressed decimally represents the percentage of viable seed. The per cent. of purity multiplied by the per cent. of germinations, divided by 100, will show the intrinsic value of the seed. This is the fairest method of estimating the quality of seed, since the grower is interested in the number of plants he can obtain from a given quantity of seed. If a certain sample of seed should give 90 per cent. purity and 90 per cent. germination, its value, according to this method, would be 81 per cent. In the foreign seed laboratories fees are charged for testing and certifying to the quality of seeds. These are paid by the dealer and usually include a reëxamination free of charge to the planter if he is not satisfied with the seed when purchased. To protect the dealer, a certain quantity of seed must be purchased, and other requirements are made to insure against substitution on the part of the consumer. In the United States, where little seed is sold under guaranty, the few laboratories do not make charges for inspection. Naturally seed that has been examined and certified to brings a higher price in the market, but unfortunately the overwhelming sentiment in America seems still in favor of cheap seed regardless of the quality.

For full descriptions of methods, etc., see *United States Department Agriculture Yearbook*, 1894, and subsequent volumes.

SEE'LAND. One of the Danish islands. See ZEALAND.

SEELEY, sē'lĭ, HARRY GOVIER (1839—). An English geologist and paleontologist, born in London and educated at the Royal School of Mines and then at Sidney, Sussex College, Cambridge. He arranged the fossils in the Woodwardian Museum and became professor and lecturer in King's College and Queen's College, London, in 1876, and dean of the latter in 1881. His paleontological researches include the discovery of skeletons of the Pareiasaurus and of the Cynognathus. His works include: *Ornithosauria* (1870); *Physical Geology and Palæontology* (1884); *The Fresh-water Fishes of Europe* (1886); *Factors in Life* (1887); and *Dragons of the Air* (1901).

SEELEY, JOHN ROBERT (1834-95). An English essayist and historian, born in London, educated at Christ's College, Cambridge. In 1863 he was appointed professor of Latin in University College, London, and in 1869 professor of modern history at Cambridge, a position which he retained till his death. His *Ecce Homo* (published anonymously in 1865), a plain account of Christ the man, excited great interest and called forth much discussion and many replies. It was supplemented by *Natural Religion* (1882). His valuable contributions to history comprise *The Life and Times of Stein* (1878); and *The Expansion of England* (1883). The importance of this work lies in its clear setting forth of the reasons of the long struggle (1688-1815) between France and England. He published *The Growth of British Policy* in 1895. Consult the memoir by Prothero prefaced to that work.

SEELIGER, zā'lĭ-gĕr, HUGO (1849—). A German astronomer, born at Biala, in Austrian Silesia, and educated in Heidelberg and at Leipzig, where he became assistant in the observatory in 1871. In 1881 he was appointed director of the Observatory of Gotha and in 1882 he received a like position and a chair in the university at Munich. He wrote: *Untersuchungen über die Bewegungsverhältnisse in dem dreifachen Sternsysteme ζ Cancri* (1881; 2d series, 1888; 3d series, 1894), *Zur Theorie der Beleuchtung der grossen Planeten, insbesondere des Saturns* (1887); and *Allgemeine Probleme der Mechanik des Himmels* (1892).

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SEELYE, sē'lĭ, JULIUS HAWLEY (1824-95). An American author and educator, born in Bethel, Conn. He graduated at Amherst College in 1849 and studied theology at Auburn Theological Seminary and at the University of Halle, Germany, after which he returned to America and was pastor of the First Reformed Church at Schenectady, N. Y., from 1853 to 1858, when he was elected professor of mental and moral philosophy at Amherst College. In 1874 he was elected as a result of a non-partisan movement a member of Congress, where, despite the fact that he was a Republican, he opposed the establishment of the Electoral Commission. From 1879 until 1890 he was president of Amherst College. His publications include: A translation of Schwegler's *History of Philosophy* (1856); *The Way, the Truth, the Life* (1873; translated into Hindustani, Japanese, and German); *Christian Missions* (1875); and a version of Hickock's *Moral Science* (1880).

SEELYE, LAURENUS CLARK (1837—). An American clergyman and educator, born at Bethel, Conn. He was educated at Union College, at the Andover Theological Seminary, and at the universities of Berlin and Heidelberg. In 1863 he was ordained pastor of the North Congregational Church of Springfield, Mass. In 1873 he was elected the first president of Smith College (q.v.), which he organized and developed, and whose policy and curriculum he largely determined.

SEEMANN, zā'mān, BERTHOLD (1825-71). A German explorer and naturalist, born in Hanover. He was a member of the British expedition which sailed in the *Herald*, and visited the West Indies, Central and South America, the Arctic, the Hawaiian Islands, and South Africa (1847-51). In 1852 he published *Narrative of the Voyage of the Herald* (German, 2d ed. 1858). In 1860 he visited the Fiji Islands, and from 1864 to 1866 explored Venezuela and Central America. Among his numerous publications both in English and in German are: *Viti, Account of a Government Mission to the Vitian or Figan Islands* (1862); *Die in Europa eingeführtem Akazien* (1852); *Die Volksnamen der amerikanischen Pflanzen* (1851); *Popular History of the Palms* (1855; German, 2d ed. 1863); and a *History of the Isthmus of Panama* (2d ed. 1867). In 1853 he founded the botanical periodical *Bonplandia*, which from 1864 to 1871 he continued in England as the *Journal of British and Foreign Botany*.

SEFFNER, zĕf'nĕr, KARL (1861—). A German sculptor, born at Leipzig, where he studied at the academy in 1877-84, especially under Melchior zur Strassen (1832-96). After a short apprenticeship in Berlin he worked in Italy (1885-88) and settled at Leipzig, where he won a great reputation by his portrait busts and statues, full of animation and keenly characteristic. Besides the busts of Anton Springer, Karl Thiersch, and other scholars (1889-93, Leipzig University), there should be mentioned those of "King Albert and Queen Carola of Saxony" (Leipzig Museum), the bust of Wilhelm Scherer (Berlin University), and the monument to Karl von Hase (Jena). Of especial interest and merit are the monuments to Bach and Goethe (represented in his student years), at Leipzig.

SEGANTINI, sä'gän-tē'nē, GIOVANNI (1858-99). An Italian figure and landscape painter, born at Arco, South Tyrol. His parents died when he was young and he became a herdsman. Later he entered the Brera Academy at Milan, where he won prizes, at the same time gaining his livelihood by painting signs and advertisements. His "Ave Maria" won the gold medal of the Amsterdam Exhibition of 1883, but he failed to win the approbation of the Milanese public until the exhibition of his large canvas "The Alpine Pasture" (1895). Transcripts from the hard life of the peasant are "At the Close of Day" (1888), "The Watering Trough" (1889), "Plowing" (1896), and similar scenes showing a monotonous, trivial life overwhelmed by the cold, hard majesty of nature. Segantini towers above other Italian painters of the nineteenth century by reason of his originality and power. An intense realist, he saw the hard facts of existence through no softening medium. The atmosphere of his pictures is keen and crystalline; the objects stand out in sharp relief. A picture, "Sorrow Finding Comfort in Faith" (1896), marks the later development of his art when he sought for the expression of moral and mystical ideas. Of this type are "Punishment of Luxury" (Walker Gallery, Liverpool); "The Retribution of Unnatural Mothers," a subject taken from Hindu poetry; and a treatment of the virgin and the infant Jesus called "The Inspiration of an Alpine Flower." Consult the monograph by Ritter (Vienna, 1897).

SEGES'TA (Lat., from Gk. Ἔγεστα, *Egesta*, Αἴγεστα, *Aigesta*). An ancient city in Northwestern Sicily, about six miles from its seaport, near the modern Castellamare. The town belonged to the Elymi, a tribe whom the Greek colonists found in the extreme west of the island, and whose ethnology is uncertain. Later tradition attributed the foundation to a band of fugitives from Troy, and in Roman times this was connected with the wanderings of Æneas. The coins seem to indicate some truth in the tradition of a Phocæan (less probably Phocian) element in the population. The place was reckoned among the non-Hellenic cities, and was engaged in frequent strife with its Dorian neighbor, Selinus (q.v.). In the fifth century B.C. it sought Athenian support, and in B.C. 415 brought about the disastrous attack on Syracuse. In B.C. 409 it turned to Carthage for help, and thus led to the destruction of Selinus and the renewal of the long war between the Carthaginians and Greeks. It was besieged unsuccessfully by the elder Dionysius, but later must have left the Carthaginians, for it is called an ally of Agathocles in B.C. 306. On his return from Africa that tyrant demanded a huge contribution, and when refused charged the city with conspiracy and massacred with tortures a great part of the inhabitants. From that time the town seems to have lost its importance, though it was especially favored by the Romans. During the Saracenic wars the site was abandoned and is now only marked by a picturesque and well-preserved though unfinished Doric temple and a fine rock-cut theatre. Excavations have also brought to light a few remains of private houses.

SEGESVÁR, shĕ'gĕsh-vär. An Hungarian city. See SCHÄSSBURG.

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SEGHERS, sā'gĕrs, or **ZEGERS,** DANIEL (1590-1661). A renowned Flemish flower painter, born at Antwerp, where he studied under Jan Brueghel, entered the guild in 1611, embraced Catholicism and in 1614 joined the Order of the Jesuits. After his return from a sojourn in Rome he rapidly acquired great reputation and his pictures were in such demand that he could scarcely fulfill his numerous commissions, and royalties granted privileges to the Jesuits in order to secure works from his brush. He seldom painted flower pieces exclusively, but usually in collaboration with historical painters, surrounding their sacred subjects, most generally the Madonna, with a garland. In this way he coöperated with Rubens, Schut, Diepenbeeck, and Quellinus. His flowers, sometimes highly finished, then again treated more decoratively, show admirable drawing, great truth to nature, and tasteful arrangement. The color of his red roses has remained unchanged to this day, while those of every other flower painter have turned or faded away altogether. Specimens of his art may be seen in nearly all the public galleries of Europe.

His brother GERARD (1591-1651), who usually signed his name Zegers, was an historical painter of considerable merit, born at Antwerp, where he studied under Van Balen and Abraham Janssens. In 1610 he went to Italy, partook of the manner of Caravaggio in Rome, and thence proceeded to Madrid, where he painted historical subjects and musical conversations for Philip III. After his return to Antwerp in 1620, allied in friendship with Rubens and Van Dyck, he worked much under their influence. The "Adoration of the Magi" (1630), in Notre Dame at Bruges, is considered his masterpiece.

SEGMENT (Lat. *segmentum*, piece cut off, from *secare*, to cut; connected with OHG. *saga*, *sega*, Ger. *Säge*, AS. *saga*, Eng. *saw*). In geometry, a portion of a circle or of a sphere cut off by a secant line or plane. The former is called a *circular* segment and the latter a *spherical* segment. If the secant is a diameter of the circle or a diametral plane of the sphere, the segments are equal and are semicircles or hemispheres respectively; otherwise they are unequal and the lesser one is called the minor and the greater the major segment. The area of a circular segment in a circle of radius r, whose chord subtends a central angle θ, is $\frac{r^2(\theta - \sin\theta)}{2}$. θ being measured in radians. For the volume of a spherical segment, see MENSURATION.

SEGNERI, sân-yā'rê, PAOLO (1624-94). An Italian Jesuit mission preacher. He was born at Nettuno, educated by the Jesuits in Rome, and joined the Society in 1637. He attained high rank as a preacher and appealed to the emotional southern temperament of his hearers by a highly dramatic manner. But his many sermons which have been preserved have intellectual qualities and justify his selection by Pope Innocent XII. as a preacher at the Papal Court. There is an edition of his sermons and other works in Italian (Milan, 1845-47), and his famous *Lenten Sermons*, *Panegyrics*, *Manna of the Soul*, and *Practice of Interior Recollection with God* have all been translated into English and published in London (1872-81). Consult his *Life* (London, 1851).

SE'GO. A fortified post of French West Africa. See SEGU-SIKORO.

SEGOVIA, sâ-gō'vê-â, or WANKS. A river forming in the lower half of its course the boundary between Honduras and Nicaragua (Map: Central America, E 3). It rises in the mountains near the Gulf of Fonseca and flows northeast in a course of 400 miles, emptying into the Caribbean Sea at Cape Gracias á Dios. It is navigable for small river craft 170 miles from its delta, being then obstructed by rapids. The channels of the delta, however, are very shallow and the coast lagoon into which they discharge is silting up.

SEGOVIA. The capital of the Province of Segovia, in Old Castile, Spain. It is situated on the north slope of the Sierra de Guadarrama, 40 miles northwest of Madrid (Map: Spain, C 2). The old part of the town is built on an oblong, rocky hill with nearly precipitous sides, 330 feet high. It is surrounded by a wall with 86 towers, running along the brink of the hill, and, though dating from the eleventh and the twelfth centuries, in a good state of preservation. The northwestern corner of the hill is a narrow, precipitous promontory between the River Eresma and a small tributary, and on this is perched the famous Alcázar, an imposing castle built in the fourteenth century, where Isabella of Castile was crowned. It has two large towers crowned with bartizans, and formed an important part of the fortifications. Noteworthy are the numerous churches. Including the old deserted monasteries, there are no less than 73 ecclesiastical buildings in this little town, and some of them, such as the cathedral, rank among the finest in Spain. The cathedral is a large Gothic basilica, begun in 1525, with two rows of chapels, flying buttresses, and a square tower, 345 feet high, crowned by a cupola. The San Estéban has a high Byzantine tower. The Roman aqueduct is the largest Roman monument extant in Spain. It crosses the valley between the mountains and the town in 119 arches, having for some distance another tier of arches above them. Some of the arches are 94 feet high. There are paper and flour mills, iron and lead foundries, and dyeing establishments. Population, in 1900, 14,658.

SEGUIDILLA, sā'gê-dē'lyâ (Sp., little sequence, diminutive of *seguida*, succession, from *seguir*, from Lat. *sequi*, to follow). A national Spanish dance in $\frac{3}{4}$ time. Its characteristic is the rhythmic figure

which is played on castanets for four bars as an introduction. After every movement it is repeated for four bars. The music is usually played on a guitar with castanet accompaniment, and during the dance the musicians also sing. The seguidilla is danced by several couples, who arrange themselves in two parallel lines. After nine bars of music the dancers slowly change places, dance again, and return to their original positions. The third part of the seguidilla is suddenly interrupted on the ninth bar and the dancers remain motionless for a second in the exact postures held by them at the time.

SEGUIN, sâ'găn', EDOUARD ONESIMUS (1812-80). A noted French-American physician, born at Clamecy, Nièvre, France, and educated in Paris at the colleges of Auxerre and Saint

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Louis. From 1837 he devoted his life to the treatment of idiots. In 1884 the Academy of Sciences in Paris declared that to Seguin was due the credit of the solution of the problem of the care and education of idiots. After the revolution of 1848 Seguin came to the United States, and after a short sojourn at Cleveland, Ohio, he attached himself to the school for idiot children in South Boston and to the institution for feeble-minded youth in Barre, Mass. He assisted in the organization of an experimental school in Albany, N. Y., which later developed into the New York State Idiot Asylum at Syracuse. Seguin settled in Portsmouth, Ohio, in 1851, in the practice of medicine; but he frequently taught at institutions for idiots in Connecticut, Ohio, and New York, and at one time he was at the head of a Pennsylvania institution. After a sojourn of four years in Mount Vernon, N. Y., he removed to New York City in 1863, where in 1879 he established the Seguin Physiological School for Feeble-Minded Children. Among his works are: *Traitement moral, hygiène et éducation des idiots et des autres enfants arriérés* (1846); *Images graduées à l'usage des enfants arriérés et idiots* (1846); *Historical Notice of the Origin and Progress of the Treatment of Idiots* (trans. by Newberry, New York, 1852); *Idiocy and Its Treatment by the Physiological Method* (1886); *Wunderlich's Medical Thermometry*, with additions (New York, 1871). See IDIOCY; SEGUIN, EDWARD CONSTANT.

SEGUIN, sê-gwĭn', EDWARD CONSTANT (1843-98). An eminent American neurologist, born in Paris, France, and the son of Edouard O. Seguin (q.v.). Coming to the United States with his father, he settled in Cleveland, Ohio. He was educated at Mount Vernon, N. Y., at the College of Physicians and Surgeons, New York City, and under Brown-Séquard, Charcot, Cornil, and Ranvier in Paris, 1869-70. He was lecturer and later professor in the College of Physicians and Surgeons, New York City, 1871-85. He founded the clinic for nervous diseases in this college in 1873. Seguin was a founder of the New York Neurological Society and of the American Neurological Association. In advance of the appearance of Nothnagel he delivered masterly lectures on cortical localization, and in advance of Erb and of Charcot he described spastic spinal paralysis under the very unfortunate name 'tetanoid paraplegia.' He added much to the knowledge of medication in nerve diseases. His greatest achievement in therapeusis is probably his advocacy and introduction of very large doses of the iodides, called the 'American method.' To him we owe most of our knowledge of the use of aconitia, and of a large increase in the understanding of hyoscyamus, as well as of arsenic in its application in chorea. He was the editor of *The American Series of Clinical Lectures*. His articles on quinine used subcutaneously, the pathological anatomy of the nervous system, myelitis of the anterior horns, cortical localizations, the use of the bromides, paraplegia, neuralgia, electricity, potassium iodide, etc., were collected and published under the title *Opera Minora* (1884). See his biography and a sketch of his literary life in *Medical News*, lxxii., 312 and 582 (New York, 1898).

SÉGUR, sâ'gŭr'. A noble French family of Guienne. PHILIPPE HENRI, Marquis de Ségur-Ponchat (1724-1801), served in the wars of Louis XV., and under Louis XVI. was Minister of War. —LOUIS PHILIPPE, Count Ségur d'Aguesseau (1753-1830), was born in Paris. He was one of the French officers under Rochambeau in the American Revolution. In 1783 he was sent as French Ambassador to Russia and became a great favorite of Catharine II. His public career during the Empire was respectable, but not brilliant. He died in Paris. He left many works, among which are: *La politique de tous les cabinets de l'Europe* (1793); *Tableau historique et politique de l'Europe de 1786-1796* (1800); *Histoire universelle* (1817); *Mémoires* (1825-26).—His son, PHILIPPE PAUL, Count de Ségur (1780-1873), was a general of the First Empire. He participated in various campaigns of Napoleon, and during the Russian campaign of 1812 was general of brigade. At the first Restoration he was given command of the cavalry, but after the second Restoration withdrew into private life until after the July Revolution. In 1831 he was made lieutenant-general and raised to the peerage. He wrote the valuable *Histoire de Napoléon et la grande armée pendant l'année 1812* (1824). Other works of his are: *Lettre sur la campagne du général Macdonald dans les Grisons* (1802); *Histoire de Russie et de Pierre le Grand* (1829); *Histoire de Charles VIII., roi de France* (1834).

SÉGUR, JOSEPH ALEXANDRE, Vicomte de (1756-1805). A French writer of comedy and libretto. He was born in Paris, was brought up for the army, and was Deputy of the nobility in the States General of 1789, but was ruined by the Revolution and was compelled to make a living by literary work. Several political brochures were followed by the *Correspondance secrète de Ninon de L'Enclos* (1790), which brought the author immediate popularity. *La femme jalouse* and *Le retour du mari* appeared soon after. Ségur wrote the French words for Haydn's *Creation*, produced at the Opéra. He published in 1795 an interesting account of his imprisonment during the Revolution: *Ma prison depuis le 23 Vendémiaire jusqu'au 10 Thermidor*. His last work, published in 1803 and very popular at the time, was entitled: *Les femmes, leurs cœurs, leurs passions, leur influence, et leur condition dans l'ordre moral*. His *Œuvres diverses* were published in 1819.

SEGURA, sâ-gōō'rä. A river of Southeastern Spain. It rises in the Sierra de Segura, in the Province of Jaen, and after an east-southeasterly course of about 150 miles enters the Mediterranean 19 miles southwest of Alicante (Map: Spain, D 3). The Segura supplies water to several canals in the Province of Alicante, so that, although it drains an extensive area, it is navigable only for small boats even at its mouth.

SE'GU-SIK'ORO, or SEGO. A fortified post on the right bank of the Niger in the interior of French West Africa, about 670 miles east-southeast of Saint Louis (Map: Africa, D 3). It consists practically of a group of villages stretching along the Niger and containing a population of about 36,000.

SEHARUNPOOR, sê-här'ŭn-pōōr'. A town of India. See SAHARANPUR.

SEIDL, zī'd'l, ANTON (1850-98). A musical conductor, born in Pesth. He was educated at

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the Leipzig Conservatory and upon graduation became chorusmaster at the Vienna Opera. Hans Richter introduced him to Wagner, who engaged him to assist in preparing the Nibelung Trilogy, upon which work he was engaged until 1879. Upon Wagner's recommendation Angelo Neumann engaged him as conductor for the itinerant series of Wagner operas (1879-83). In 1885 Seidl accepted an engagement in New York as conductor of the German opera. There he soon developed the concert orchestra popularly known as the Seidl Orchestra. In 1892 the German opera was temporarily discontinued, but he again served as conductor during the New York seasons of 1895-96 and in 1897. In addition he was the conductor of the Philharmonic Society and of the Sunday night concerts. In 1897 he was engaged as one of the conductors at Covent Garden, London. By this time his reputation was such that his services were in demand in several of the leading musical centres of the world. In 1886 and 1897 he was one of the conductors at the Bayreuth Festival. He died in New York.

SEIDL, GABRIEL (1848—). A German architect, born in Munich, where he studied at the Academy under Neureuther, and after 1876 became favorably known through the erection of several buildings in the style of the German Renaissance, marked by refined elaboration of interior details. Besides the private residences of Lenbach and F. A. Kaulbach, he built Saint Ann's Church, the Künstlerhaus and the new part of the National Museum.

SEIDL, JOHANN GABRIEL (1804-75). An Austrian poet, born in Vienna. He studied law and was called in 1840 to Vienna as custodian of the cabinet of coins and antiques in the Museum. He devoted his leisure to literature and became especially well known for his lyric and dialect poetry. His publications in this department include *Dichtungen* (1826-28), *Gedichte in niederösterreichischer Mundart* (1844, 4 eds.), *Bifolien* (1855, 5 eds.), and *Natur und Herz* (1859, 3 eds.). Seidl is the author of the Austrian national hymn (1854) set to Haydn's music.

SEIDLITZ (sĕd'lĭts) **POWDERS** (named from the town of *Seidlitz* or *Sedlitz*, in Bohemian Austria). Powders composed of 120 grains of tartrate of soda and potash and 40 grains of bicarbonate of soda reduced to powder, mixed, and inclosed in a blue paper, and 35 grains of powdered tartaric acid in a white paper. The contents of the blue paper are dissolved in half a tumbler of water, and those of the white in a half tumbler of water, and the two are poured together. The mixture should be taken while the effervescence from the liberation of the carbonic acid is still going on. These powders act as an agreeable and mild cooling aperient.

SEIGNIORAGE (ML. *senioraticum*, lordship, dominion, from Lat. *senior*, elder, lord, comp. of *senex*, old; connected with Gk. ἕνος, *henos*, Skt. *sana*, Lith. *senas*, OIr. *sen*, Goth. *sineigs*, old). The excess of the nominal value of a coin over its bullion value at the moment of coining. Such excess may represent only the cost of coinage, for which the term brassage, used by French writers, has been proposed, but not generally adopted, or it may represent a profit to the State. Where free coinage exists any mint charge or seigniorage will act as a check upon the readiness with which private persons bring bullion to the mint for coinage. On the other hand, such a seigniorage offers an inducement to the State to coin money freely. If it yields to the temptation it may gain an immediate advantage, but not without jeoparding the security of its currency and running the risk of depreciating the value of its issues. Monetary legislation authorizing underweight coins usually limits the amount of such issues.

SEIGNIORY (ML. *senioria*, from Lat. *senior*, elder, lord). The domain of a seignior or feudal lord, and, in the strict sense, the ultimate unit in the feudal system. It was a local fragment of sovereignty annexed to property in land. The beginnings of the seigniory are to be found in the late Roman Empire in the authority (*patrocinium*) which the great provincial magnates (*potentes*) exercised over the common people, especially the tillers of the soil. Among the German tribes which overthrew the West Roman Empire the germs of similar relations existed. The German noble had rights of protection (which implied control) over free followers, servants, and tenants who voluntarily 'commended' themselves to him and became his 'men.' In the Frankish Empire these Roman and German institutions were fused into the 'seniorate,' and the powers of the 'senior' were enlarged and consolidated by the development of the 'immunity.' Immunity, another institution which dates from the late Roman Empire, and which originally meant exemption from taxes and the baser services, was ultimately granted in the Carolingian period to all who held royal land as a 'benefice' or fief, and it came to include much of the power of local government. The grant of immunity excluded the regular officers of the Empire (the counts) from entry (*introitus*) into the immune district; it devolved upon the seignior the right and duty of raising and leading the armed forces of the district, of preserving the peace, and collecting fines from those who broke it; and it gave him jurisdiction in all 'minor cases' (*causæ minores*) over his followers, servants, and tenants. In criminal cases and in cases involving status the county court was still exclusively competent; but when one of the seignior's men was charged with a criminal offense it was customary to appeal first of all to the seignior, and if the complainant was satisfied by the seignior the case went no further. Thus there was developed in the seigniory a seigniorial or manorial court, in which the seignior's *advocatus* (*vogt*) or bailiff presided and in which (usually) judgments were approved by the tenants. After the overthrow of the Frankish Empire the seigniors became petty monarchs of their seigniories, exercising nearly all the powers of the State. In the open country the free and previously independent inhabitants of the seigniory were forced into subjection, and for the most part reduced to serfdom. In the towns, on the contrary, the authority of the seigniors was gradually extinguished and all the townsmen became free.

Toward the close of the Middle Ages, in consequence of the increase of royal power, the authority of the seigniors was gradually restricted. The military and taxing powers of the Crown were exercised directly within the seigniories. The rights which the seigniors retained were eco-

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nomic rather than political: the political powers which they held longest were those of local police. These remnants of seigniorial authority were swept away by revolution or extinguished by legislation in the eighteenth and nineteenth centuries. For literature, see under FEUDALISM.

SEINE, sän. One of the principal rivers of France. It rises on the Plateau of Langres in the Department of Côte-d'Or, and flows in a general northwest course of 472 miles, passing through the city of Paris and emptying into the English Channel through a wide estuary at Havre (Map: France, F 2). It falls very rapidly in its upper course, but below Paris its current becomes slow and its course marked by many windings. Its principal tributaries are the Marne and the Oise, both joining it from the north near Paris. The Seine is the most important commercial waterway of France, and considerable engineering works have been undertaken to facilitate its navigation, including a number of locks between Paris and Rouen. The river is navigable 337 miles to Méry, but from Marcilly, a little below Méry, a lateral canal follows its course to Troyes. Along the north shore of the estuary a ship canal 14 miles long leads from Tancarville into the harbor of Havre, while other canals connect the river through its tributaries with the Loire, the Rhone, the Rhine, the Meuse, and the Scheldt. The traffic passing through the river amounted in 1900 to 7,494,037 tons at Paris. Consult: Lavoinne, *La Seine maritime et son estuaire* (Paris, 1885); Barron, *La Seine* (ib., 1889.).

SEINE. The metropolitan department of France surrounded by the Department of Seine-et-Oise, and comprising the arrondissements of Paris, Saint-Denis, and Sceaux (Map: France, J 3). It is at once the smallest and the most populous department in the Republic. Its area is 185 square miles. Population, in 1896, 3,340,514; in 1901, 3,669,930.

SEINE-ET-MARNE, ā märn. A northern inland department of France (q.v.), bounded on the west by the Department of Seine-et-Oise (Map: France, J 3). Area, 2275 square miles. Population, in 1896, 359,044; in 1901, 358,325. The department derives its name from the two chief streams that water it, the Seine flowing through the southern and the Marne through the northern part. There are no mountains. Timber is grown in every part, and among the forests is that of Fontainebleau. The soil is generally fertile. Wheat is the principal cereal. Paving stone is quarried at Fontainebleau, and there are manufactures of flour and sugar. Capital, Melun.

SEINE-ET-OISE, ā wäz. A northern department of France, surrounding the metropolitan Department of Seine (q.v.) (Map: France, H 3). Area, 2184 square miles. Population, in 1896, 669,098; in 1901, 707,325. The chief rivers are the Seine and the Oise, which have numerous affluents. Oats is the principal cereal, and wheat, sugar beets, forage roots, cider apples, and vegetables are important. The industries include silk, wool, and flax spinning, hosiery making, flour milling, sugar refining, and the manufacture of iron and copper articles. There are several fine varieties of stone and clays. Porcelain is largely made at the famous Sèvres (q.v.) factories. Capital, Versailles.

SEINE-INFÉRIEURE, ăn'fā'rē-ĕr'. A northern maritime department of France, bounded on the northwest by the English Channel, and on the south by the Department of Eure (Map: France, G 2). Area, 2448 square miles. Population, in 1896, 837,824; in 1901, 853,883. The Seine flows through the southern districts, and a number of important though small streams flow northwest across the department. Wheat, oats, sugar beets, colza, and cider apples are cultivated, and some cheese is made. There are cotton, wool, and flax manufactures; iron, copper, locomotive, and machinery works are among the industrial establishments. Capital, Rouen.

SE'IR (Heb. *Sē'ir*). A synonym for the land of Edom (e.g. Gen. xxxii. 3), and especially the name of the Edomite mountain land, Mount Seir (e.g. Deut. ii. 1). It is disputed whether the name is applied only to the mountains or also to the region west. In the patriarchal tradition, Esau, ancestor of the Edomites, is etymologically connected with Seir, he being described as a man 'of hair' (*sē'ār*, Gen. xxv. 25; xxvii. 11). But in Gen. xxxvi. 20 sqq. Seir is the ancestor of the Horites (q.v.), the aboriginal inhabitants. In a papyrus of Ramses III. (B.C. 1300) the Seirites are mentioned as a Bedouin tribe. The name is therefore ancient and its etymology uncertain, whether it is to be derived from the people or from the land. In the latter case, just as Edom, 'red,' describes the prevailing color of these mountains, so Seir, 'hairy,' 'shaggy,' or perhaps 'awful,' may express the roughness of the country. This great mountain ridge, composed of argillaceous rock, porphyry, and sandstone, extends from the Dead Sea to the Gulf of Akabah on the Red Sea. It presents a precipitous front to the west and is broken by deep valleys, but the vegetation is rich and allows cultivation. Its most famous peak is Mount Hor, reputed scene of the death of Aaron, and its chief city the famous Petra (q.v.), in the neighborhood of which are to be seen some of the most remarkable and beautiful rock-formations in the world. The mountains were the home of a hardy race, which enriched itself through its command of the trade routes from Arabia to the Mediterranean, and which later spread north into Palestine. Consult: Robinson, *Biblical Researches* (vol. ii., Boston, 1841); Palmer, *Desert of the Exodus* (Cambridge, 1871); Trumbull, *Kadesh-Barnea* (New York, 1884). See EDOM.

SEISIN (OF. *seisine, saizine, saisine*, Fr. *saisine*, from OF. *seizir, saizir*, Fr. *saisir*, to seize, take possession of, probably from OHG. *sazzan, sezzan*, Ger. *setzen*, Eng *set*, to put, place). Actual possession of land by a person entitled to it, or claiming to have a freehold interest therein. This is sometimes spoken of as *seisin in deed*, as distinguished from *seisin in law*, which is a mere right of present possession. By the old common law, seisin denoted the completion of feudal investiture of a tenant, accompanied by the rites of homage and fealty, after which he had the elements of a feudal title—possession and right of possession. This was done by a formal ceremony on the land, known as the 'livery of seisin' (q.v.). In most of the United States, delivery of a deed is equivalent to livery of seisin, and no formal entry on the land is necessary. However, the term seisin is still retained in our law, but there is some confusion as to its technical

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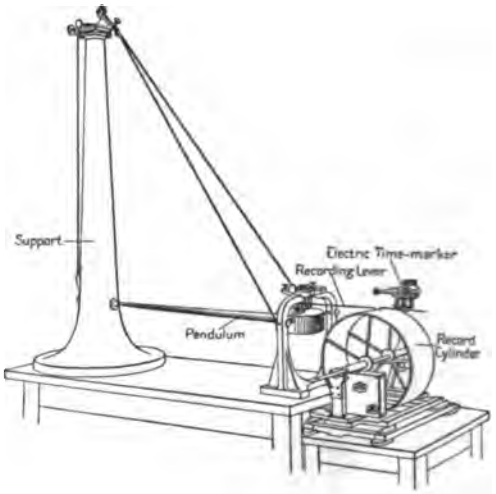
meaning, the courts in some States using it as synonymous with actual possession, and others in the sense of ownership. Consult: Blackstone, *Commentaries;* also 12 Law Quarterly Review, 246 (London, 1896).

SEISMOGRAPH (from Gk. σεισμός, *seismos*, earthquake + γράφειν, *graphein*, to write), SEISMOMETER, or SEISMOSCOPE. Names given to instruments designed to indicate and record an earthquake shock. By the term seismoscope is generally implied an object that is moved by the earthquake and leaves a record of its motion. The seismometer or seismograph, on the other hand, records the period, extent, and direction of the disturbance. A trough of mercury with notches makes a useful seismoscope, as the direction of the movement is indicated by noting the point where the mercury overflows.

Pendulums are also used as seismoscopes, and this form of apparatus has been rendered self-recording and forms seismometers or seismographs now in use. These pendulums consist of heavy masses delicately suspended so that they remain stationary during any vibration of the earth, and consequently can trace a record of the movement of the earth with respect to the pendulum. Two types of pendulum seismograph are used: those which employ a vertical pendulum, such as the Italian observers have used for many years, and those provided with a horizontal pendulum, a form preferred by the Japanese, English, and European scientists. The horizontal pendulum was invented by Hengler in 1832 and was subsequently improved and adapted to scientific use by Professor Zollner of Leipzig. In connection with the horizontal pendulum a recording device is used which in the instruments constructed during the last few years is photographic and employs a moving strip of bromide or other paper on which a beam of light is reflected by mirrors connected with the apparatus. In former instruments a blackened surface on which a point traced a line and other registering devices were used. In the bracket arrangement of the horizontal pendulum a heavy weight is supported at the extremity of a horizontal bracket free to turn about a vertical axis at the opposite end. Any movement of the earth affects the stand and surrounding objects, but is not communicated to the suspended mass. This instrument has been used in Japan in connection with a photographic register as described above, with considerable success. The horizontal pendulum of Professor Ernst von Rebeur Paschnitz of Merseburg is the form most used in Europe and has also been tested in Japan. In this apparatus there are one or two horizontal pendulums so that a vibration in any direction is recorded.

A simple horizontal pendulum seismograph which is now extensively used was devised by Professor John Milne of England. This instrument consists of a horizontal pendulum which carries a boom at whose extremity there is an aluminum plate in which there is a transverse slit. This slit is placed above and at right angles to a second slit beneath which there is a moving band of bromide paper. Light from a lamp is reflected through the intersection of these two slits in the form of a point when the two slits are in their position of rest, and makes a straight line on the moving paper. If there is any movement of the earth there is a movement of one slit with respect to the other, causing a wavy line to be produced which indicates the tremors observed at the particular station. A clockwork arrangement opens and closes a shutter at regular intervals so that the light from the lamp makes a record of the time on the moving strip. Professor Milne in his observatory on the Isle of Wight using such an instrument is able to detect disturbances in Japan, Borneo, South America, or elsewhere, and the seismograms thus obtained, taken in connection with telegraphic information and interchange of observations at other stations, enable the velocity, wave movement, source, and other features of an earthquake to be studied.



OMORI SEISMOGRAPH OF U. S. WEATHER BUREAU.

For further information on seismometers, the reader is referred to Milne, *Earthquakes and Other Earth Movements* (London and New York, 1886); miscellaneous papers on seismology in *Nature* (London), by the same author; Reports of the Committee on Seismological Investigations of the British Associations (to be found in the annual reports of the meetings of the association); and *The Seismological Journal of Japan*. See EARTHQUAKE.

SEISMOLOGY. See EARTHQUAKE.

SEISS, sēs, JOSEPH AUGUSTUS (1823-1904). An American Lutheran clergyman. He was born at Graceham, Md., and studied for two years at Pennsylvania College, Gettysburg. After a course of private instruction in theology, he became a pastor at Martinsburg and Shepherdstown, Va., in 1843, moved to Cumberland, then to Baltimore, Md., and in 1858 became pastor of Saint John's, Philadelphia. In 1874 he built and inaugurated the Church of the Holy Communion in that city. For twelve years he was editor of *The Lutheran* and for a time an editor of *The Prophetic Times;* also a founder of the General Council of the Church. Some of his books are: *Baptist System Examined* (1854; 3d ed. 1882); *Last Times* (1856; 7th ed. 1880); *Ecclesia Lutherana* (1867); *Lectures on the Gospels* (1876); *Luther and the Reformation* (1883).

SEISTAN, sâs-tăn′, or **SISTAN**. A region in Eastern Persia and Southwestern Afghanistan, between latitudes 30° and 31° 35′ N., and longitudes 60° and 62° 40′ E. (Map: Persia, H 5). The Persian-Afghan boundary was determined

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in 1870-72 by an English boundary commission, which gave Sistan proper (mostly west of the Helmund) to Persia, and outer Sistan (to the east and southeast of Sistan proper) to Afghanistan. The Persian district is mostly sandy, but well watered and productive. Outer Sistan is only sparsely inhabited. The inhabitants are Persians and Baluchis. The region abounds in relics of antiquity, and before the ravages of Tamerlane, in the fourteenth century, was one of the most important of the Persian provinces.

SEITZ, zĭts, ANTON (1829-1900). A German genre painter, born at Roth-am-Sand, near Nuremberg. He was especially successful with interior scenes on miniature scale, remarkable for delicate elaboration of the figures, fine chiaroscuro, and subtle humor, which earned him the name of the Munich Meissonier. A partial list of his principal works includes: "The Miser" (1860); "Dice-Players in a Tavern" (1862); "Rural Letter-Writer" (Germanic Museum, Nuremberg); "Vagabonds" (New Pinakothek, Munich); "Champion Shot" (1874, D. W. Powers, Rochester, N. Y.); "Capuchin Monk in Peasant's Cottage" (1883, Leipzig Museum); and "Political Declaration" (1891).

SE'JANT (OF. *seant*, from Lat. *sedens*, pres. part. of *sedere*, to sit), or ASSIS (Fr.). In heraldry (q.v.), a term of blazon applied to a beast represented as preparing for action.

SEJA'NUS, ÆLIUS (?-A.D. 31). A favorite and minister of the Emperor Tiberius (q.v.). Sejanus was born at Vulsinii. His father was Sejus Strabo, commander of the prætorian guard under Augustus. When Sejus Strabo became governor of Egypt (A.D. 14) Ælius was set over the prætorian cohorts, whom he united (A.D. 23) and with whose support he for a while held Rome in his sway. In order to make himself eventually Emperor, he persuaded Tiberius to withdraw to Capri. With Livia, wife of Tiberius, whom he had debauched, he plotted and brought about in A.D. 23 the death of Drusus Cæsar (q.v.) and got rid of Agrippina (q.v.), wife of Germanicus, and her sons Nero and Drusus. Tiberius named Sejanus to be consul along with himself for the year 31 and then to be pontifex, but he became suspicious of Sejanus and had him killed with many of his suspected followers and his whole family. Our rather uncertain authority is Tacitus. Consult Jülg, *Vita Lucii Ælii Sejani* (Innsbruck, 1882).

SELACHII, sê-lā'kĭ-ĭ (Neo-Lat. nom. pl., from Gk. σέλαχος, *selachos*, shark). A group of fishes including the sharks and rays. See CARTILAGINOUS FISHES. For fossil forms, see SHARK.

SE'LAH. A rubrical note found in Hebrew psalms and prayers. It occurs as follows: In 39 Psalms, 71 times; in Habakkuk iii. (properly a psalm), 3 times; in the *Eighteen Benedictions*, one of the most ancient portions of the Jewish liturgy, twice; also with more or less authority in other prayers of the Jewish ritual. In the Septuagint it is represented by the term *diapsalma;* the Hebrew text is generally followed, but the term is sometimes omitted, sometimes supplied, where not found in the Hebrew. The Selah is also found twice in the Greek *Psalms of Solomon* (first century B.C., translated from a Hebrew original). In two-thirds of the cases in the Bible, it is found at the end of evident strophes, four times at the end of the psalm; in most of the remainaing cases, in connection with a quotation. In general, therefore, it indicates some natural break in the hymn. The most probable explanation is that advanced by Dr. C. A. Briggs, that the term is connected with a verb meaning 'to lift up,' in the sense of 'raising' a hallelujah, and that it was the rubrical direction for choric doxologies, which are found at the end of the first four Books of the Psalms (xli. 13; lxxii. 18-19; lxxxix. 52; cvi. 48), and which were used at the end of each psalm in the services. This view is supported by some of the Greek and Syriac renderings of the term, and by Jacob of Edessa and Jerome. Consult: Jacob in *Zeitschrift für alttestamentliche Wissenschaft*, vol. xvi. (1896); C. A. Briggs in *Journal of Biblical Literature*, vol. xviii. (1899); E. C. Briggs in *American Journal of Semitic Languages*, vol. xvi. (1899).

SEL'BORNE, LORD. See PALMER, Sir ROUNDELL.

SEL'BY. A river port in the West Riding of Yorkshire, England, on the Ouse, 20 miles east of Leeds (Map: England, E 3). An ancient Gothic cross adorns the market-place. The famous parish church, 306 feet long by 60 feet wide, was part of a Benedictine abbey founded by William the Conqueror in 1068. Population, in 1901, 7800. Consult Morrell, *History of Selby* (Selby, 1867).

SEL'DEN, JOHN (1584-1654). An English jurist and Orientalist. He was born near Worthing, in Sussex, studied at Hart Hall, Oxford, and studied law at the Inner Temple. In 1610 appeared his *Janus Anglorum, Facies Altera* (English translation, 1683), which dealt with the progress of English law down to Henry II.; and in 1614 was published his *Titles of Honour*. In 1623 he was elected member for Lancaster, and from this period till his death he took a considerable part in public affairs. In 1626 he took part in the impeachment of Buckingham; in 1627 he was counsel for Sir Edward Hampden in the celebrated Five Knights Case; in 1628 he played an important rôle in drawing up and passing the Petition of Right, and for his participation in the tumultuous closing scene of the Parliament of 1629 was committed to the Tower for two years. In 1640 he was chosen member for the University of Oxford. After the execution of Charles I. (of which it is certain he strongly disapproved), he took little share in public matters. The principal writings of Selden deal with ancient Hebrew law and include: *De Successionibus in Bona Defuncti Secundum Leges Hebræorum* (1634); *De Successione in Pontificatum Hebræorum Libri Duo* (Leyden, 1638); *De Jure Naturali et Gentium Juxta Disciplinam Hebræorum* (1640). His *Mare Clausum* (published in 1635, though written sixteen or seventeen years before) was a reply to Grotius's *Mare Liberum*. He left besides a great variety of posthumous works, of which the most famous, and also the most valuable, is his *Table-Talk*, recorded and published by his amanuensis, Richard Milward, in 1689, and recently reprinted (London, 1868). Consult Johnson, *Memoirs of John Selden* (10 vols., London and New York, 1883-84).

SEL D'OR (Fr., salt of gold). A name given to sodium aurothiosulphate, which is used in photography. It was originally employed to aid

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in fixing the image on a daguerreotype plate. At present it is used in toning positive prints. It is formed by gradually adding a neutral 2 per cent. solution of gold chloride to a solution containing three times as much sodium thiosulphate. After each addition it is necessary to wait until the red liquid which is formed loses its color, after which the salt is precipitated with strong alcohol, and then allowed to crystallize.

SELENE, sē-lē'nē (Lat., from Gk. Σελήνη, connected with σέλας, *selas*, brightness, Skt. *svar*, Av. *hvaŝ*, sun). The Greek name of the moon and its goddess, called also Μήνη, *Mēnē*, and in Latin Luna. Her myth is differently told, but the most common account makes her a daughter of Hyperion and Theia, and sister of Helios (the sun) and Eos (the dawn). She was represented as riding in a chariot drawn by a span of horses, winged, and shedding soft light from her golden crown, or else riding on a horse or mule. Legend said that by Zeus she became mother of Pandia, 'the all-shining,' and that Pan had also won her love. Most famous was her passion for Endymion, who, according to the Carian legend, lay sunk in eternal sleep in a cave on Mount Latmos, where he was nightly visited by Selene. In Elis, however, the story told how she bore to Endymion, son of the King, fifty daughters. The sharply transparent character of the name seems to have kept Selene from developing into so distinct a personality as other early moon-goddesses. When Apollo became so strongly identified with the sun, it was natural that Artemis should be restored to her position as a moon-goddess, and in later literature and art we find the crescent an attribute of Artemis or Diana. Consult Roscher, *Ueber Selene und Verwandtes* (Leipzig, 1890), and *Nachträge* (Leipzig, 1895).

SELEN'GA. A river of Northern Asia, rising in the Khangai Mountains of Mongolia. It flows for a considerable part of its course in a northeastern direction, and after turning to the north, passes into the Siberian territory of Transbaikalia, and enters Lake Baikal through a wide delta (Map: China, B 2). Its total length is over 700 miles, and, although its swift current interferes to some extent with navigation, it is an important factor in the commercial intercourse between Mongolia and Siberia, flowing through the most settled part of Transbaikalia and touching the Trans-Siberian Railway. Its fisheries, which are exploited on a considerable scale, also add to the economic importance.

SELENITE (Lat. *selenites*, *selenitis*, from Gk. σεληνίτης, relating to the moon, from σελήνη, *selēnē*, moon). The variety of calcium sulphate, or gypsum, that is crystallized in the monoclinic system. It is usually white or tinged with light shades of green, gray, or yellow. Fine specimens are found at Bex, Switzerland; in Sicily; in England; also in Nova Scotia, and in the United States at various localities, in New York, Maryland, Ohio, and Kentucky. It sometimes occurs in broad transparent sheets as much as one yard across. In this condition the mineral is capable of being split into extremely thin plates that are flexible and were used by the ancients in place of glass.

SELENIUM (Neo-Lat., from Gk. σελήνη, *selēnē*, moon). A chemical element discovered in 1817 by Berzelius, who obtained it from crystals formed in the lead chambers of sulphuric acid works. The element is somewhat widely distributed, though in small quantities. It occurs chiefly in combination with copper, lead, and silver, as in clausthalite (lead sulphide), lehrbachite (lead and mercury sulphide), onofrite (mercury selenide and sulphide), crookesite (copper, thallium, and silver selenide); also in smaller quantities in other minerals, especially in certain pyrites and chalcopyrites. It is obtained chiefly from the flue dust formed in roasting sulphides containing selenium, or from the deposits in the lead chambers of sulphuric acid works. These deposits are mixed with equal parts of sulphuric acid and water to a thin paste, and then boiled, with the addition, from time to time, of a little nitric acid, or potassium chlorate, until the red color disappears and the solution of selenic acid thus obtained is heated with fuming hydrochloric acid, yielding selenious acid, the cold solution of which, when saturated with sulphur dioxide, furnishes a red pulverulent precipitate of selenium.

Selenium (symbol Se; atomic weight, 79.17) exists in several allotropic forms, of which the red or amorphous variety, which is soluble in carbon disulphide, has a specific gravity of 4.3, and has no definite melting-point, but softens gradually on heating. When the soluble selenium is slowly heated from 100° C. to 217° C., it passes into a black, glossy, metallic crystalline mass, which has a specific gravity of 4.8, is insoluble in carbon disulphide, and melts at 217° C. Selenium is both odorless and tasteless, but it burns with a reddish-blue flame that has a peculiar odor resembling horseradish. The crystalline variety of the element conducts electricity, its resistance increasing when heated, but diminishing considerably on exposure to light, especially red rays. The change of conductivity is instantaneous, and is almost doubled in sunlight, though even the light from a small lamp has a perceptible influence. It was upon this property that the construction of the *photophone* (q.v.) was based. With oxygen selenium forms a dioxide, which combines with water to form selenious acid. A selenic acid is produced by the action of chlorine on aqueous selenious acid. Selenious and selenic acids form salts, termed, respectively, selenites and selenates.

SELENKA, zā-lĕŋ'kä, Emil (1842-1902). A German zoölogist, born in Brunswick, and educated there at the Collegium Carolinum and at the University of Göttingen, under Keferstein. In 1868 he was made professor of zoölogy and comparative anatomy at Leyden, and in 1884 he accepted a chair in Erlangen. His works dealt chiefly with comparative anatomy and embryology of the vertebrates, *Zoologische Studien* (1878-81), *Entwickelungsgeschichte der Tiere* (1883-92), *Zoologisches Taschenbuch* (3d ed., 1885), and *Menschenaffen* (1898-1902) being the chief titles.

SELEUCIA, sē-lū'shĭ-ä (Lat., from Gk. Σελεύκεια, *Seleukeia*). The name of a number of ancient cities of Asia, situated in Syria, Pisidia, Pamphylia, Cilicia, Caria, and Mesopotamia, founded during the earlier existence of the dynasty of the Seleucidæ (q.v.). The most noted of these were: (1) Seleucia Pieria (near the modern Suadeiah), founded by Seleucus Nicator at the foot of Mount Pieria, on the seashore, about 4 miles north of the mouth of the Orontes, and strongly fortified. It was the seaport of Antioch, and became of great importance during the wars between the Seleucidæ and the Ptolemies for the

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possession of Syria. Its once magnificent port is still in a good state of preservation, while the tunnel, 1088 yards in length, excavated out of solid rock, and forming the only communication between the city and the sea, together with the remains of its triple line of walls, its citadel, temples, amphitheatre, and necropolis, attest the former importance and splendor of the city. Seleucus himself was buried there. In B.C. 246 the city was taken by Ptolemy Euergetes, but Antiochus the Great recaptured it in 219. In 108 it gained independence, which Pompey confirmed in 70. By the fifth century A.D. it had entirely decayed. (2) SELEUCIA AD TIGRIM was also built by Seleucus Nicator on the west bank of the Tigris, about 40 miles northeast of Babylon, which was despoiled to supply materials for the construction of the new city. Situated in a district of great fertility, and controlling the navigation of the Tigris and Euphrates, as well as the commerce of Mesopotamia, it rapidly rose to wealth and splendor, supplanting Babylon as the capital of the eastern portion of the Seleucid monarchy, and containing in the acme of its greatness a population of more than 600,000. During the decline of the Seleucid monarchy it became independent, and attracted, because of its wealth and splendor, the robber tribes of Southern Armenia and Media, who partially plundered it on more than one occasion. It was burned by Trajan (A.D. 116), and subsequently by Lucius Verus, and when visited by Septimius Severus was desolate. (3) SELEUCIA TRACHEOTIS (on the site of the modern Selefkeh) was also built by Seleucus on the western bank of the Calycadnus in Cilicia Aspera. It was a rival of Tarsus, and was the birthplace of several famous men, among them the philosopher Xenarchus. Its site is still covered with its ruins. (4) SELEUCIA was likewise the name of a city in the Persian district of Margiana, originally built by Alexander the Great, and called Alexandria. Antiochus I., who rebuilt it after it had been destroyed by the barbarians, renamed it in honor of his father, Seleucus Nicator. The Roman prisoners taken by the Parthians at the defeat of Crassus (q.v.) were colonized here. (5) SELEUCIA IN MESOPOTAMIA (modern Bir) was a fortress on the left bank of the Euphrates, opposite the ford of Zeugma. There were several other cities of this name, as that on the River Belus, in Syria; on the plain of Isparta, in Pisidia; in Pamphylia, near the mouth of the Eurymedon, and elsewhere; while the city of Tralles (q.v.) was at one time called Seleucia.

SELEU'CIDÆ or **SELEU'CIDS.** The dynasty which ruled over that portion of Alexander the Great's monarchy which included Syria, a large portion of Asia Minor, and the whole of the eastern provinces of Bactria, Sogdiana, Persia, and Babylonia.

Seleucus I. Nicator (B.C. 312-c.280), the first of the line, was the son of Antiochus, a distinguished officer in the service of Philip of Macedon. He had been one of the conspirators against Perdiccas, and in the second partition of the provinces constituting Alexander's realm, Babylonia fell to his lot. To this, with the aid of Antigonus, he added Susiana, but a misunderstanding arose between the two generals, and Seleucus took refuge in Egypt (B.C. 316). Four years later Seleucus returned to his satrapy, amid the congratulations of his subjects. The date of Seleucus's return to Babylon was the beginning of the era of the Seleucidæ, which was employed by the Syrians and Asiatic Greeks until the fifteenth century. Recovering Susiana, Seleucus subjugated Media, and extended his power to the Oxus and Indus. Of his campaign against the Indian King Sandrocottus (q.v.) there are but few facts known. In B.C. 306 he assumed the title of King, and four years later he joined the confederacy of Ptolemy, Lysimachus, and Cassander against Antigonus, and by his cavalry and elephants decided the issue of the battle of Ipsus in B.C. 301 or 300 against his quondam ally, who was killed in the fight. Being now the most powerful of Alexander's successors, he obtained the largest share in the conquered kingdom, a great part of Asia Minor and the whole of Syria falling to him. In 293 he gave the provinces beyond the Euphrates to his son, Antiochus, who afterwards succeeded him. He afterwards waged successful wars against Demetrius, King of Macedon, and Lysimachus, King of Thrace. He was assassinated about B.C. 280 by Ptolemy Ceraunus. His son and successor was Antiochus I. Soter (c.280-61), followed by his son Antiochus II. Theos (261-46), who was assassinated by Seleucus II. Callinicus (246-26). Seleucus II. was driven from his kingdom by Ptolemy Euergetes (q.v.). He recovered his throne on Ptolemy's withdrawal, and succeeded in maintaining his hold on Syria and most of Asia Minor against both the Egyptians and his younger brother, Antiochus, who attempted to exercise independent authority over part of Asia Minor. Seleucus undertook an expedition against the revolted provinces of Parthia and Bactria, but was routed by Arsaces the Great, the deliverer of Parthia, while in the west several provinces were wrested from him by Attalus, the King of Pergamum. His sons, Seleucus III. Ceraunus (226-23) and Antiocus III. the Great (223-187), were his successors. The latter was vanquished by the Romans at Magnesia in B.C. 190 and forced to relinquish a great part of Asia Minor. Seleucus IV. Philopator (187-75) was eager to dispossess Attalus of the provinces which he had taken, but fear of the Romans prevented him from carrying out his design. He was succeeded by Antiochus IV. Epiphanes (175-164), in whose reign the Jews rose under the Maccabees. The succeeding princes of the dynasty were Antiochus V. Eupator (164-62); Demetrius I. Soter (162-50), who was defeated and slain by the impostor Alexander Balas (150-46); Demetrius II. Nicator (146-38, 128-25), who overthrew the impostor, and was himself a prisoner among the Parthians for ten years, Syria having been seized by Diodotus, surnamed Trypho, who set up the puppet Antiochus IV. Theos (c.144-42), and afterwards ascended the throne himself (142-37); Antiochus VII. Sidetes (137-28), who restored the royal line of the Seleucidæ, after whom Demetrius again reigned until his defeat by the pretender Alexander Sebina, his rule marking the loss of the original centre of Seleucian power to the Parthians; Antiochus VIII. Grypus (125-96), who was compelled to share his dominions with his half-brother, Antiochus IV. Cyzicenus from B.C. 111; Seleucus V. or VI. Epiphanes (96-94), and Antiochus X. Eusebes (95-83), who continued the division until about B.C. 94, when the latter was victorious in a pitched bat-

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tle, and seized the whole kingdom, for which, however, he was forced to fight with Philip, and Antiochus XI. Epiphanes (q.v.), the younger brother of Seleucus, and Demetrius III. Eucærus (94-88), a third brother of Seleucus, who, with Philip, next claimed the sovereignty, which was taken from them by Tigranes (83-69), King of Armenia, at the solicitation of the Syrians; Antiochus XII. Dionysus (q.v.), a fourth brother of Seleucus, and Antiochus XIII. Asiaticus (69-65), who came into conflict with the Romans, and was deprived of his possessions, which were converted into a Roman province by Pompey in B.C. 64.

SELEU'CUS. See SELEUCIDÆ.

SELF (AS. *self*, *seolf*, Goth. *silba*, OHG., Ger. *selb*, self; perhaps connected with Ir. *selb*, possession). In psychology, a term synonymous with the 'conscious individual;' i.e. a self is a mind *plus* a body. It covers the whole range of consciousness, and is completed only in the course of the individual's existence. It is conceivable that a self should exist without self-consciousness or a consciousness of self. The self is the organism—mind and body—considered structurally; consciousness of self is a function performed by those conscious processes which refer to or ideate the self. Self-consciousness, then, is set over against consciousness of external reality, of things which lie outside the individual. The two consciousnesses are composed of similar processes, but have entirely different references. Self may also mean the mental *ego* alone. Even in the narrower sense, a 'self' or a 'mind' implies more than a collection of mental processes taken at haphazard. It implies the interrelations which always subsist among the processes of a given individual. It is often said that 'no two people are alike,' and this is undoubtedly true, quite apart from bodily differences. The dissimilarities which inhere in selves or minds are to be referred to unlikenesses of mental constitution (q.v.), i.e. to differences in memory-type, in habitual modes of association, in temperament, in liability to emotional excitement, in differences in the unitariness of one's experiences, in rash impulsiveness or balanced sanity, in tendency to criminal action or to religious fervor, and so on. All these things are indicative of ultimate variations in mental tendency. They form the basis for the heterogeneity of society.

When an individual's act exhibits his peculiar mental constitution we say that the act is 'characteristic,' that 'it is just like him,' meaning that in the action the individual has expressed his 'self-hood,' that the act was not determined by a chance impulse, but that it represented a long line of 'tendency' (q.v.). Consult authorities under SELF-CONSCIOUSNESS.

SELF-CONSCIOUSNESS. Self-consciousness or 'consciousness of self' may be either a perception or idea or it may be a concept. When one thinks of one's existence as an individual (a certain mind and a certain body) one has an 'idea of self.' If self is considered in the abstract, without any personal reference—not 'myself,' or 'himself,' or 'herself,' simply a 'self'—it becomes a concept; psychology is interested in such a concept only in so far as it is interested in concepts in general, i.e. in seeking to determine the mental processes that underlie their formation. (See CONCEPT.) It has more to investigate in the perception or idea of self. Psychology has to ask (1) what processes enter into the formation of the perception or idea, and (2) how the self comes to be perceived or ideated. These questions are most easily answered by saying that the self is a simple, unitary, active 'principle' or 'thing' which dwells within the body and directs it. But since no such 'principle' or 'thing' can be found when the mind is looked at critically, we must infer that this notion of self is got by putting a concrete though fantastic filling into the abstract conceptual self. If we scrutinize the self-idea for its real 'empirical' filling, we find that its contents vary from day to day, from minute to minute. Now it is 'myself' as performing my part in a given situation, social, professional, domestic, religious; now it is 'myself' carrying certain responsibilities, owing certain obligations, sustaining certain relations with others, possessing property, family, friends. But in all this shifting of the self-idea there are certain constant elements which support the whole. The most prominent of these are one's name, the words 'I' and 'my;' visual and tactual perceptions of the body; numerous sensations of internal movements; a feeling of 'self-complacency;' 'self-satisfaction;' and a mass of relatively stable organic sensations which are not ordinarily analyzed and referred to their various points of origin, but come to consciousness 'in the lump.' The constancy and stability of all these things depend upon bodily and mental constitution (see MENTAL CONSTITUTION and SELF), which means in every individual a tendency to appear, to feel, and to act in a definite and permanent manner.

The origin of the idea of self is partly social and partly individual. Every person is an *object* to other persons. He is treated as a permanent being, as a centre of activity and as a unit in the community. In addition to this, his own experience is more or less coherent, more or less of a whole, and his conscious actions lead him to consider himself as an originator in the external world of things. See WILL and APPERCEPTION.

Consult: Wundt, *Physiologische Psychologie* (Leipzig, 1893); Ribot, *Diseases of Memory* (Eng. trans., New York, 1882); James, *Principles of Psychology* (ib., 1890); Kuelpe, *Outlines of Psychology*, trans. (ib., 1895); Titchener, *Outline of Psychology* (ib., 1899); Stout, *Manual of Psychology* (ib., 1899); Royce, *Psychology* (ib., 1903).

SELF-DEFENSE. In law, the defense of one's person or property from threatened violence or injury by the exercise of force. Self-defense is one of the forms of remedy by self-help (q.v.). In general one may defend himself from assault or unlawful attack by the use of force provided he use no more force than is necessary to accomplish that result, and his act will give rise to no civil or criminal liability. If he use more force than is necessary to repel the attack, he will be liable both civilly and criminally for assault. Under these conditions both the assailant and the person assailed may be guilty of assault. The rule that, in the exercise of his right of self-defense, one may meet force with force is subject to one other important qualification. He may not carry his forcible resistance to the point of taking life when he may safely retreat from his assailant. Whenever

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the circumstances will not permit him to retreat from his assailant with apparently reasonable safety, he may kill his assailant if such action be necessary to protect his own life or to protect his person from severe bodily injury, and his act will be deemed justifiable homicide (q.v.). Under any other circumstances the killing of an assailant under guise of self-defense is manslaughter (q.v.), and may be murder (q.v.) if the killing is premeditated. Upon the principle of self-defense one may forcibly resist an illegal arrest. The resistance, however, must fall short of taking life unless the consequence of the arrest would be to take the prisoner to an uncivilized country, where he would be beyond the reach of legal process. In that case he may kill if necessary to prevent the arrest. One may also forcibly resist an unlawful attack upon another, particularly if that other is one who has a natural claim to his protection, as a wife, child, or even a servant who is a member of his family. The law of defense of property is precisely like that relating to the defense of the person, except that under no circumstance is the taking of life as a means of protecting property justifiable. One who kills to protect property is guilty of manslaughter, and if the killing is premeditated or done under circumstances of aggravation, it may be murder.

The law also recognizes a distinct right to protect the dwelling house, as it is called, which combines the characteristics of both defense of the person and defense of the property. At common law, one's dwelling house was said to be his castle. The true meaning of the phrase is that one has the right to make his dwelling a means of defense. Once inside his dwelling, or 'at the threshold' as it was said, he might forcibly resist attacks upon himself and the other inmates of the dwelling and, without retreating, kill his assailant if necessary to repel the attack. See REMEDY; MURDER; MANSLAUGHTER; HOMICIDE.

SELF-DENYING ORDINANCE. A measure carried through the English Parliament in 1645 by the influence of Cromwell and the Independents, with the view of removing inefficient or lukewarm commanders from the army. The ordinance proposed that no member of either House should, during the war, enjoy or execute any office or command, civil or military, and that those holding such offices should vacate them in forty days. It was intended to take the executive power out of the hands of the more moderate politicians, and form an army independent of Parliament; and was the subject of violent and protracted debate, but eventually passed in both Houses, and became law. Essex, Warwick, Manchester, and others resigned, and the conduct of the war was intrusted to Fairfax. Cromwell, to whom, as a member of the Lower House, the Self-Denying Ordinance extended as much as to Essex and the rest, had the duration of his commission prolonged by the Commons on account of his invaluable services as a leader of cavalry, and by his brilliant achievements soon surpassed his commander in reputation.

SELF-HELP. A legal phrase signifying that form of remedy by which one may prevent or redress a wrong without resorting to a legal proceeding, as, for example, the right of self-defense; the right to abate a nuisance; the right of the owner to retake property of which he has been wrongfully deprived. See REMEDY; SELF-DEFENSE; DISTRESS; NUISANCE, etc.

SELF-INDUCTION. See ELECTRICITY, paragraph *Induced Electric Currents.*

SELF'RIDGE, THOMAS OLIVER, JR. (1836—). An American naval officer, born in Boston, Mass., and educated at Annapolis. In the Civil War he commanded the *Osage* in the Red River expedition, during which he inflicted a heavy loss on the Confederates at Blair's plantation, and later led a division of the landing sailors who bombarded Fort Fisher. After the war he directed the surveys for the canal across the Isthmus of Panama, in 1869-73; was a member of the International Congress held at Paris to consider the question of that canal in 1876; and, while in charge of the Newport torpedo station (1881-85), invented a means of protecting ships from torpedoes. In 1896 he became rear-admiral, and he retired in 1898.

SELIGMAN, EDWIN ROBERT ANDERSON (1861—). A political economist, born in New York City. He graduated at Columbia College, 1879, and received the degrees of Doctor of Philosophy and Bachelor of Laws from the same institution in 1884, after having studied at Berlin, Heidelberg, Geneva, and Paris. In 1885 he became prize lecturer, in 1888 adjunct professor, in 1891 professor of political economy and finance at Columbia University. In 1901 he became president of the American Economic Association. His principal works are: *Railway Tariffs and the Interstate Commerce Law* (1887); *Two Chapters on the Mediæval Guilds of England* (1887); *The Shifting and Incidence of Taxation* (1892; 2d ed., enlarged, 1899); *Essays in Taxation* (1895; 3d ed. 1900); *The Economic Interpretation of History* (1902).

SE'LIM, *Turk. pron.* sâ-lēm'. The name of three sultans of the Ottoman Empire. SELIM I., son of Bajazet II., was born about 1467. He became Sultan in 1512, after dethroning his father with the aid of the Janizaries. To secure himself, he caused his father, brothers, and nephews to be put to death, thus beginning a policy which won for him the surname of the Inflexible. In 1514 he invaded Persia and massacred 40,000 Shiites. He defeated the army of Shah Ismail near Khoi, in Azerbaijan, conquered Mesopotamia and Kurdistan, overran Armenia, and, leaving his lieutenants to complete this conquest, marched against Kansuh El-Ghuri, Mameluke Sultan of Egypt, whom he had previously endeavored to detach from alliance with the Persian monarch. The Mameluke army was totally defeated (1516) at Marj Dabik, and Syria became the prize of Selim. Kansuh's successor, Tuman Bey, succumbed to the Turkish arms and Egypt was incorporated with the Ottoman Empire (1517). The last lineal descendant of the Abbassid caliphs, who was then resident in Egypt, transmitted to Selim the title of Imam and the standard of the Prophet. The Ottoman Sultan thus became chief of Islam, as the representative of Mohammed, and the sacred cities of Mecca and Medina acknowledged his supremacy. Selim laid the foundation of a regular navy, constructed the arsenal of Pera, disciplined the Janizaries, and improved the organization of his empire. He died on September 22, 1520. Selim was an able statesman and a lover of literature and poetry.

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He was succeeded by his son, Solyman the Magnificent.

SELIM II. (1524-74), known as the Drunkard, was the son of Solyman the Magnificent. He succeeded his father in 1566. The Turkish dominions were extended by the subjugation of Yemen (1570) and the conquest of Cyprus from the Venetians (1571), but the naval power of the Ottoman Empire suffered a blow in the defeat at Lepanto (q.v.), in 1571, from which it never recovered.

SELIM III. (1761-1808) was the only son of Mustapha III., and ascended the throne on the death of his uncle, Abd-ul-Hamid I., in 1789. He inaugurated a radical progressive policy to counteract the dangers that threatened his empire. He inherited a war with Russia and Austria, which he closed by the Treaty of Sistova with Austria (1791) and that of Jassy (1792) with Russia, whose frontiers were advanced to the Dniester. The invasion of Egypt by Napoleon (1798) led to war with France, which was concluded by a treaty signed in 1802, the Sultan remaining thereafter friendly to the French. In attempting to reorganize the army on a European model and to introduce innovations in industry Selim III. aroused all the bigotry of his subjects. In May, 1807, a formidable rebellion broke out at Constantinople, headed by the Janizaries, and the Sultan was compelled to issue a decree abrogating his reforms, but this failed to satisfy the leaders of the insurrection, and Selim saw himself forced to resign the throne to his cousin, Mustapha IV. In the 1808 uprising Mustapha-Bairaktar, the Pasha of Rustchuk, one of the Sultan's chief advisers, marched upon Constantinople, in order to reinstate Selim on the throne, but the unfortunate monarch was strangled by order of Mustapha IV.

SELI'NUS (Lat., from Gk. Σελινοῦς, *Selinous*). An ancient Greek colony in Southwest Sicily, at the mouth of the Selinus river. It was founded about B.C. 629 by colonists from Megara Hybla. Its constant wars with the neighboring Elymi of Segesta led to the Athenian expedition, B.C. 415, and later to Carthaginian intervention, which resulted in the destruction of the city, B.C. 409. Though reëstablished, the city never regained its former prosperity, and during the First Punic War (about B.C. 250) the Carthaginians removed the inhabitants to Lilybæum. The ruins include the walls of the ancient Acropolis on a hill above the sea, the Necropolis, and especially the temples, seven in number in two groups, four on the Acropolis and three on a hill to the east, one of which is among the largest Greek temples known. It has an extreme length of about 371 feet and breadth of 177 feet, while the cella alone is 228×59 feet. Consult Benndorf, *Die Metopen von Selinunt* (Berlin, 1873).

SELJUKS, sĕl'jōōks. A Turkish dynasty which ruled over a great part of Western Asia in the eleventh and twelfth centuries. A few years after the death of Mahmud of Ghazni (q.v.) in 1030, the Ghuz Turks, under the leadership of two brothers, Tchakyr Beg and Tughrul (Togrul) Beg, grandsons of a chieftain named Seljuk, overran Persia and made themselves masters of it. Tughrul Beg established his authority in the dominions of the Caliph of Bagdad, by whom he was proclaimed 'King of the East and of the West.' In 1063 Tughrul died and was succeeded by Alp Arslan (q.v.), whose dominions extended northeastward far into Turkestan, and who carried his arms into Armenia and Georgia and against the Greeks. In 1071 he took the Byzantine Emperor Romanus Diogenes prisoner in a battle fought in Armenia. Alp Arslan was succeeded by Malek Shah (1072-92), in whose reign the Seljukian Turks established their dominion in Syria and Asia Minor, where independent Seljuk sovereignties were founded. In Asia Minor arose the Sultanate of Iconium (Konieh) or of Rum (that is, the land of the Greeks, or Byzantines, whose country was known to the Mohammedans under the name of *Rum*, Rome). Toward the end of Malek Shah's reign arose the sect of the Assassins (q.v.), under the notorious Hassan ibn as-Sabbah. Malek Shah was followed by his sons, Nasir ad-Din (1092-94) and Barkiyarok (1094-1104), both rulers of little initiative. Another son, Mohammed (1104-18), who had absorbed much of the kingdom before his accession, proved more energetic. He made an active campaign against the Assassins, and was on the point of reducing them by famine when he died. He was followed by his last surviving brother, Sanjar (1118-57). This monarch paid little attention to the provinces west of Khorasan, which were broken up into little principalities, but retained firm control of the eastern districts as far as Transoxania. Within less than half a century after his death the remnants of Seljuk dominion in Iran were swept away by the Khwaresmians. In 1096 the Seljuks came into collision with Western Christendom, whose armies in the First Crusade took Jerusalem in 1096. The armies of the Second Crusade (1147-48) fought unsuccessfully against Nureddin, who made himself master of Syria, and whose dominions after his death (1174) became the prey of Saladin, Sultan of Egypt. The Sultanate of Rum outlived the other Seljuk realms, surviving till the close of the thirteenth century, when it was broken up into fragments on whose ruins the Ottoman Turks laid the foundations of their empire.

The Seljuk period is noteworthy in the history of Persian literature as being its second golden age. At the Court such poets as Omar Khayyam, Farid ud-Din Attar, Jalal ud-Din Rumi Sadi, and Anvari were honored, while art and science flourished as they have never since flourished in Persia.

Consult: Houtsma, *Recueil de textes relatifs à l'histoire des Seldjoucides* (Leyden, 1886-91); Horn, "Geschichte Irans in islamitischer Zeit," in Geiger and Kuhn, *Grundriss der iranischen Philologie*, ii. (Strassburg, 1900).

SELKIRK, or **SELCRAIG**, ALEXANDER (1676-1723). An English mariner, supposed prototype of Robinson Crusoe. He was born at Largo, Fifeshire, and early joined privateering expeditions to the South Seas. In 1704, when sailing-master of the *Cinque Ports*, he quarreled with the captain, and was at his own request put ashore upon the island of Juan Fernandes. After a residence there of four years and four months, he was rescued by Capt. Woodes Rogers, who subsequently gave him command of the *Increase* prize-ship. He again went to sea, and rose to be lieutenant of H. M. S. *Weymouth*, on board of which he died. In 1712 there appeared Capt. Rogers's *Cruising Voyage Round the World* and Capt. Edward Cooke's *Voyage to the South*

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Sea, from which Defoe is thought to have obtained most of the information he possessed respecting Selkirk. Selkirk is also the subject of Cowper's *Lines on Solitude*. Consult Howell's *Life and Adventures of Alexander Selkirk* (Edinburgh, 1829). See JUAN FERNANDEZ.

SELKIRK, THOMAS DOUGLAS, fifth Earl of (1771-1820). A colonizer and man of letters, born in Kirkcudbrightshire, Scotland, and educated at the University of Edinburgh. His life was devoted mainly to directing emigration from the Scottish Highlands to British North America. In 1803 he made a settlement at Prince Edward's Island, which from the first was prosperous; and after heroic efforts and a bloody conflict with the Northwest Fur Company, he finally established, under the auspices of the Hudson's Bay Company, a colony in the Red River Valley, now the flourishing Province of Manitoba (1817). In 1818 he left America, and, completely broken in health, went to Pau, in Southern France, where he died. An account of his troubles in settling the Red River territory is given in his *Sketch of the British Fur Trade in North America* (1816). Consult Bryce, *Manitoba* (London, 1882); and see CANADIAN LITERATURE.

SELKIRK MOUNTAINS. A mountain range in the southeastern part of British Columbia, lying west of and nearly parallel to the Rocky Mountains, from which it differs in geological formation, and from which it is separated by the long, narrow, and straight valley of the Upper Columbia River (Map: British Columbia, F 4). The latter, with its tributary, the Kootenay, and Kootenay Lake, almost completely encircles the range, which is about 200 miles long and 80 miles wide. Although lower than the neighboring Rockies, the Selkirk Range is much more Alpine in character, and consists of rugged peaks, snow fields, glaciers, and precipices, below which the slopes are densely timbered to a height of 6000 feet. The highest peak is Mount Sir Donald, with an altitude of 10,645 feet. The Canadian Pacific Railroad crosses the range at an altitude of 4300 feet through Roger's Pass, which, with the surrounding magnificent region, is a national park reserve. Consult Green, *Among the Selkirk Glaciers* (London, 1890).

SEL/KIRKSHIRE (anciently called Ettrick Forest). A southeastern county of Scotland, bounded by the counties of Midlothian, Roxburgh, Dumfries, and Peebles, on the north, east, south, and west respectively (Map: Scotland, E 4). Area, 267 square miles; population, in 1801, 5390; in 1851, 9800; in 1901, 23,340. It consists mainly of the two parallel valleys through which flow the rivers Ettrick and Yarrow. It is largely a pastoral county. The mountains, the highest of which is Dun Rig (2433 feet), are rounded at the top instead of peaked, and are covered generally with grass, affording excellent pasturage. The former extensive woods have disappeared. Capital, Selkirk. Consult: Craig-Brown, *History of Selkirkshire* (Edinburgh, 1886); Douglas, "A History of the Border Counties," in *County Histories of Scotland* (Edinburgh, 1899).

SEL/LA, QUINTINO (1826-84). An Italian scientist and statesman, born at Mosso, near Biella. He was educated at the University of Turin, and at the School of Mines, Paris, and was for a time professor in the Turin Mining Academy, attaining a wide reputation as engineer and mineralogist. In 1860 he was elected to the Chamber of Deputies. In 1861 he became general secretary in the Department of Public Instruction. He held the position of Minister of Finance three times: in 1862, under Rattazzi; in 1864-65, under La Marmora; and from 1869 to 1873, under Lanza. He showed himself a good financier and an excellent parliamentarian. He was president of the Accademia dei Lincei (q.v.).

SEL/LAR, WILLIAM YOUNG (1825-90). A Latinist, born in Sutherlandshire, Scotland, and educated at Glasgow University and Balliol College, Oxford. In 1851 he was appointed assistant to the professor of Latin in Glasgow, and in 1853 he went to Saint Andrews as assistant to the professor of Greek, whom he succeeded six years later. In 1863 he was made professor of Latin in the University of Edinburgh, a position which he held till his death. Professor Sellar wrote *Roman Poets of the Republic* (1863; 2d ed. 1881), *Roman Poets of the Augustan Age* (1877), and *Horace and the Elegiac Poets*, ed. by W. P. Ker (1892). The three books are learned and brilliant.

SEL/LERS, COLEMAN (1827—). An American engineer and inventor, born in Philadelphia, Pa. He was associated with the Globe Rolling Mills, at Cincinnati, Ohio; the Niles Company locomotive works; and afterwards became a partner in the firm of William Sellers & Co., manufacturers of tools. His inventions include a coupling device for connecting shafting, an arrangement for feed disks for lathes, and a kinematoscope. In 1881 he became professor of mechanics in Franklin Institute, and in 1886 non-resident professor of engineering practice in the Stevens Institute of Technology. It was through his advice as consulting engineer that the work of developing the water power of Niagara was undertaken, and he became head engineer in that enterprise.

SELLERS, COLONEL MULBERRY. A Western speculator, in whose eyes every scheme had "millions in it," in *The Gilded Age*, a novel by Mark Twain and C. D. Warner.

SELLERS, WILLIAM (1824—). An American manufacturer and mechanical engineer, born in Delaware County, Pa., and educated at private schools. In 1868 Sellers became president of the Edge Moore Iron Company, and from 1873 to 1887 was head of the Midvale Steel Company, of Nicetown, Pa. The Edge Moore Iron Company made the ironwork for the buildings of the Philadelphia Centennial Exposition and for the Brooklyn (N. Y.) Bridge. In 1864 he published the first formula for screw threads and nuts, now standard in the United States and regularly used in Europe.

SEL/MA. The county-seat of Dallas County, Ala., 50 miles west of Montgomery; on the Alabama River, which is navigable to this point all the year, and on the Southern, the Western of Alabama, the Louisville and Nashville, and the Birmingham, Selma and New Orleans railroads (Map: Alabama, B 3). It has Dallas Academy, a public library, and the Alabama Baptist Colored University, opened in 1878. Noteworthy are the court house, Young Men's Christian Association building, and the Alabama River bridge. Selma is the centre of a section engaged in cotton-growing, farming, and cattle-raising,

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and has considerable industrial importance. Repair shops of the Southern Railway, cotton mills and cotton gins, a large grist mill, and manufactories of cottonseed oil, engines and boilers, machinery, wagons, bricks, and boxes are among the leading establishments. The government, under the revised charter of 1900, is vested in a mayor and a unicameral council. Selma was settled in 1823. During the Civil War it was an important military depot for the Confederate army. On April 2, 1865, after a sharp engagement, the garrison surrendered to a Federal army under General J. H. Wilson. Population, 1890, 7622; 1900, 8713.

SELOUS, *se-lōō'*, FREDERICK COURTENEY (1851—). An English hunter and explorer in South Africa. In 1871 he went to South Africa, where, for nineteen years, he was almost continuously in the field, hunting chiefly elephants and earning his living by selling ivory and natural history collections. In 1890 he piloted the pioneer expedition of the British South Africa Company through Mashonaland and he was prominent in the events that brought about the occupancy of all the large territory north of the South African Republic. In 1893 he participated in the first Matabele war. After that time he lived in Surrey, England. His publications are: *A Hunter's Wanderings in Africa* (1881); *Travel and Adventure in Southeast Africa* (1893); *Sunshine and Storm in Rhodesia* (1896); *Sport and Travel, East and West* (1900); and various contributions to geographical periodicals.

SELTERS WATER. A mineral water obtained at Selters, near Limburg, in Nassau, Germany. The spring has long been known, and has a high reputation for its medicinal qualities, being recommended as a beverage in chronic disorders of the digestive and respiratory organs. It is a sparkling alkaline water containing sodium carbonate and common salt. A mineral water of similar composition to the original is now extensively manufactured in Europe and in the United States.

SELUNGS'. The inhabitants of the Mergui Archipelago in the eastern part of the Bay of Bengal, off the coast of Tenasserim; a primitive, seafaring people of doubtful ethnological relations. They are probably a branch of the 'Indonesian' race. Consult Anderson, *The Selungs* (London, 1890).

SELWYN, *sĕl'wĭn*, ALFRED RICHARD CECIL (1824—). An English geologist. He was born at Kilmington, Eng., was educated chiefly by private tutors in England and Switzerland, and in 1845 was appointed assistant geologist on the Geological Survey of Great Britain. From 1852 to 1869 he was director of the Geological Survey of Victoria, Australia. He also made a special study of the coal and gold fields of Tasmania and South Australia, and in 1856 was a Victorian commissioner of mines. He was director of the Canada Geological Survey from 1869 to 1895, when he was retired and pensioned. In 1896 he was president of the Royal Society of Canada. He published large contributions to the *Geological and Natural History Survey of Canada* (19 vols., 1869-94), of which work he was the editor.

SELWYN, GEORGE AUGUSTUS (1719-91). An English wit. From his mother, a woman of the bedchamber to Queen Caroline, described as "of much vivacity and pretty," he seems to have derived his wit. He studied at Eton with Gray and Walpole, and thence proceeded to Hart Hall, Oxford, from which, after very irregular attendance, he withdrew without a degree, to escape expulsion for drinking from a chalice at a wine party (1745). In 1747 he entered Parliament, where he sat, a silent member usually asleep, till 1780. In the meantime he had succeeded to the family estates (1751), and had obtained several sinecures, as registrar of the Court of Chancery in Barbados and surveyor-general of the works. He became a member of the leading London clubs, where he was known as "Bosky." Many witticisms have been fathered upon Selwyn, some of which are probably not authentic. Selwyn's jokes have long since lost their piquancy. The man and the manner made them. One may be cited. When Lord Forley crossed over the Channel to escape his creditors, Selwyn remarked that it was "a passover not much relished by the Jews." A peculiar trait of the humorist was a passion for witnessing executions of famous criminals. He died in London. Consult: J. H. Jesse, *Selwyn and His Contemporaries* (London, 1843; new ed. 1882); and Roscoe and Clergue, *Selwyn, His Letters and His Life* (ib., 1899).

SELWYN, GEORGE AUGUSTUS (1809-78). A missionary and bishop of the Church of England, born at Church Row, Hampstead. He took his degree at Saint John's College, Cambridge, in 1831, was ordained deacon in 1833, and became curate at Windsor. In 1841 he was consecrated Bishop of New Zealand, and labored there till 1867, when he became Bishop of Lichfield. He displayed great ability as an organizer, both in the mission field and at home. Selwyn College, Cambridge, was erected in his memory in 1882 by popular subscription. His works include: *Are Cathedral Institutions Useless?* (1838); *Letters to the Society for the Propagation of the Gospel*, etc. (1884); *Verbal Analysis of the Holy Bible* (1855). For his life consult Tucker (London, 1879).

SELWYN COLLEGE. See CAMBRIDGE, UNIVERSITY OF.

SEMANG', or MENDI. One of the aboriginal peoples of the Malay Peninsula, inhabiting Northern Perak, Kedah, Rahman, Ranga, and Kelantan. They are short-statured and darker than the Sakai (q.v.), from whom they are also distinguished by their curly hair. The advance of the Malays and the intrusions of Siamese and Europeans, with the ever-present Chinese, are driving these aborigines farther into the interior.

SEMANTICS. That portion of linguistic science which treats of the development of signification of words. See PHILOLOGY; SEMASIOLOGY.

SEM'APHORE. A town of the County of Adelaide, South Australia, 10 miles by rail northwest of Adelaide. It is a well-known bathing resort. Population, in 1901, about 8000.

SEMAPHORE. See SIGNALING AND TELEGRAPHY, MILITARY; SIGNALS, MARINE; BLOCK SIGNALS; STORM AND WEATHER SIGNALS.

SEMASIOLOGY (from Gk. σημασία, *sēmasia*, signification + -λογία, *logia*, account, from λέγειν, *legein*, to say), or SEMANTICS. The study which treats of the meanings of words and the devel-

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opment of their signification. Thus, the Latin *altus* signifies both 'high' and 'deep,' according to the position of view, whether the observer regards the situation from above or from below. Again, the force of the verb *bless*, which is employed euphemistically in several languages to denote also to *curse* (like *bless* in colloquial English), receives a semasiological explanation on the basis of euphemism. Somewhat similar in euphemistic character is the divergence in sense between German *Lust*, 'pleasure' (in general), and modern English *lust*, 'pleasure' (in a physical sense). The atmosphere of a word is constantly subject to change, owing to such external circumstances, and it is familiarly recognized that analogous conditions will call forth parallel developments in the meaning. Thus, English *heathen* from Anglo-Saxon *hæþen*, originally denoted 'belonging to the heath,' or inhabitant of the district remote from civilization and Christianity, hence 'unbeliever.' In like manner *pagan*, from Latin *paganus*, originally signified a dweller in an outlying district (*pagus*), and thus acquired the force of 'ungodly.' The word *deer*, like its Greek cognate, *θήρ*, was originally employed to designate animals in general, but it has been gradually specialized to its present meaning, just as the older Sanskrit *mṛga*, 'animal,' has been narrowed in classic Sanskrit to designate a gazelle, whereas Avestan *mərəγa*, which is etymologically akin to it, has come to signify 'bird.' Simile and metaphor, alternation between the abstract and concrete, analogy and differentiation, tendencies to generalization and particularization, to expansion and restriction, elevation and degradation in meaning, are among the many forces which come into play in determining the significance of a word in its changes in connotation. Consult: Darmesteter, *La vie des mots* (4th ed., Paris, 1893); Svedelius, *La sémantique* (Upsala, 1891); Simon, *Die Gründe des Bedeutungswandels* (Berlin, 1894); Paul, *Prinzipien der Sprachgeschichte* (3d ed., Halle, 1898); Bréal, *Essai de sémantique* (2d ed., Paris, 1899), tr. by Mrs. Henry Cust, *Semantics: Studies in the Science of Meaning* (London, 1900); Oertel, *Lectures on the Study of Language* (New York, 1901); Welby, *Science of Meaning* (New York, 1903).

SEMBRICH, sĕm'brĭk, MARCELLA (1858—). A Polish operatic soprano, born at Wisniowczyk, Galicia. Her real name was Praxede Marcelline Kochanska, and she received her musical education under Wilhelm Stengel (who subsequently became her husband) and Epstein and Rokitansky at Vienna. Her début (1877) occurred at Athens in *I Puritani*, and she subsequently studied German opera under Richter and Lewy at Berlin. After an eighteen months' engagement at the Dresden Court Theatre she went to London, where from 1880 to 1885 she was one of the prima donnas of the London opera, in the intervals making many successful tours in both Europe and America. In 1889 she returned to Dresden, in which city she made her permanent home. She became widely known for her remarkably pure soprano and her brilliant coloratura. Her greatest popularity was achieved in the United States.

SEMÉ, se-mâ' (Fr., sown). In heraldry (q.v.) a term used to describe a shield bearing a charge repeated an indefinite number of times. It is then said to be semé of, or with that charge, as semé of fleur-de-lys.

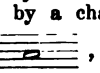
SEMELE, sĕm'ē-lē (Lat., from Gk. Σεμέλη). The daughter of Cadmus and mother of Bacchus (q.v.).

SEMEN'DRIA. A Servian fortress on the right bank of the Danube, 30 miles southeast of Belgrade (Map: Balkan Peninsula, C 2). An ancient triangular fortification, said to have been built in 1430, it is a noteworthy feature of the town. The inhabitants are employed principally in wine culture. Population, in 1895, about 7000. Semendria was at one time the seat of the Servian kings. In 1411 the Turks gained here a splendid victory over the Hungarians.

SEMENOFF, sĕm-yȩ'nôf, PETER PETROVITCH (1827—). A Russian geographer and traveler, born in Saint Petersburg and educated there and in Berlin. He traveled extensively in Western Europe, and in 1857 made a great expedition through Central Asia to the Tian Shan Mountains where Mount Semenoff and the Semenoff Glacier bear his name. He explored the upper course of the Syr Darya; and also made important discoveries in Transcaspia. Semenoff's travels were described in *Petermanns Mitteilungen* (1858) and in the *Zeitschrift* of the Berlin Geographical Society (1869). In the emancipation of the serfs he was officially prominent, and in 1864 he became director of the Bureau of Statistics.

SEMENOVKA, sĕ'myĕ-nôf'kȧ. A town in the Government of Tchernigov, Russia, about 70 miles northeast of Tchernigov. It produces hides, skins, boots, and oil, and trades in bristles. Population, 1897, 15,125.

SEMES'TER (Ger. *Semester*, from Lat. *semestris*, semi-annual, from *sex*, six + *mensis*, month). A name given in Germany to each of the two terms into which the university year is divided: the summer semester and the winter semester.

SEMIBREVE (It., *semibreve*, half-short, from *semi-*, Lat. *semi-*, half + *breve*, Lat. *brevis*, short). In music, a note of half the duration of the breve (q.v.) of old ecclesiastical music, but the longest note in use in modern music. It is popularly known as a whole note, and is represented by a character circular or elliptical in form  , and is adopted as the integer or measure-note, the other notes—minim, crotchet, quaver, etc.—being proportional parts of it. In mensurable music (q.v.) it was the fourth in value, one quarter of a large.

SEMINAR (Ger. *Seminar*, from Lat. *seminarium*, seed-plot, sg. of *seminarius*, relating to seed, from *semen*, seed, from *serere*, to sow; ultimately connected with Eng. *seed*). A name applied to certain courses given in German and American universities. They consist of research work, carried on by the students under the direction of the professor. Seminars are offered in scientific and scholastic fields affording material for the investigator. The members of the seminar meet at various times to listen to the account of some special research carried on by one of their number and to discuss it. The seminar originated in the universities of Halle and Göttingen. The first were in philology, and aimed to prepare teachers for the classical

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schools. Johns Hopkins University and other American universities generally have now introduced seminars. The character of the work done in the American seminars varies greatly in the several universities, ranging from mere reports to original contributions. Consult Perry, "The American University," in Butler, *Education in the United States* (Albany, 1900).

SEM'INOLE (properly *Simanoli*, separatist, runaway). A tribe of Muskhogean stock (q.v.), formerly residing in Florida, and celebrated for the determined resistance which they maintained for seven years against the efforts of the United States Government to remove them from their homes. They were originally a part of the Creeks (q.v.), chiefly of the Hichitee or southeastern division, and, as the name implies, separated from the main confederacy and overran the peninsula after it had been depopulated by the destruction or deportation of the Apalachee and Timucua (q.v.) by the English in 1702-3. They also received accessions from the kindred Yamassee, who had been driven out of Carolina by the English in 1715, and had also a considerable negro element from runaway slaves. In the early period they were frequently classed with the Lower Creeks, but they became recognized as a distinct tribe about the beginning of the Revolution. About the beginning of the last century they had about twenty towns, the most important being Mikasuki and Tallahassee. The people of Mikasuki were known as the 'Red Stick' Indians, from their custom of setting up a pole painted red as a war emblem, and were considered the leaders in every warlike enterprise. In 1817-23 (Florida being then Spanish territory) they came into conflict with the Americans and their country was invaded by General Jackson, who destroyed their principal towns, hung the two English traders (Arbuthnot and Ambrister) who had instigated the trouble, and ultimately brought about the cession of Florida to the United States in 1819. In 1822 they were reported to number 3100, besides 800 negroes living with them. By the Treaty of Payne's Landing in 1832 they were pledged to remove to the west of the Mississippi, but the treaty was repudiated by a considerable part of the tribe under the leadership of the young chief, Osceola (q.v.), the result being the most desperate and costly Indian war in the history of the Government. It began with the surprise and massacre of Major Dade's entire command of one hundred men on December 28, 1835, and continued until 1842, resulting in the loss of thousands of lives and the expenditure of ten million dollars. In the end the Indians were conquered and removed to the Indian Territory, with the exception of a few hundred who remained in Florida.

Those removed to the Indian Territory and their descendants constitute the 'Seminole Nation,' with a government organized upon the general plan existing among the others of the 'Five Civilized Tribes,' viz. Cherokee, Creek, Choctaw, and Chickasaw. With these also they came under agreement for individual allotment of their tribal lands and absorption into American citizenship in 1906. The number of 'citizens' of the Seminole nation officially reported in 1901 was 2757, but this includes also adopted negroes, whites, and Indians of other tribes. A special report of the census of 1890 gives them 2739 'citizens,' classified as: Seminole, pure and mixed with white, 1621; negro and mixed negro-Seminole, 806; white, 172; Indians of other tribes, 140. The report also states that the Seminole intermarry with negroes, and that probably all those given as of negro descent would be classed by the Seminole themselves as Seminole. Those in Florida are in the Everglade region in the southern portion of the peninsula and were reported at 360, a considerable increase over earlier estimates. They refuse to mingle with the whites and retain most of their primitive customs derived from their Creek ancestors, including the ceremonies of the black drink and the green corn dance. They are strict monogamists. As they have no title to their lands, the Government has taken steps to secure for them a small reservation to include their main settlements. See CREEK.

SEM'IONO'TUS. A genus of ganoid fishes, the fossil remains of which are found in the Triassic rocks of Europe. Lepidotus is an allied genus, also occurring in the Trias.

SEMIPALATINSK, sâ'mē-pâ-lâ-tyēnsk'. A territory of Russian Central Asia forming an administrative division of the Governor-Generalship of the Steppes. It is bounded by Tobolsk and Tomsk on the north, Sungaria on the southeast, Semiryetchensk on the south, and Akmolinsk on the west (Map: Asia, G 4). Its area is estimated at from 188,000 to over 194,000 square miles. In the north the surface has the appearance of a steppe. The southeastern part belongs to the region of the Altai Mountains, and other chains cover the southwestern part. There are extensive valleys between the chains. The principal river is the Irtysh, which is navigable through its entire course in the territory. The largest lake is Saisan, about 80 miles long and from 10 to 20 miles wide. There are also numerous lakes along the Irtysh and in the mountains, and Lake Balkhash touches the territory on the southwest. Gold, silver, lead, copper, graphite, and coal are the principal minerals. The climate is very severe. The winters are characterized by extreme cold and fearful snow storms, while the summers are very hot, the mean temperature ranging from 72° for July to 5° for January. The precipitation is scanty, and only in a small part of the territory can agriculture be carried on without irrigation. Agriculture is the principal occupation of the settled and of a part of the nomadic population, and is gradually increasing in importance. The principal agricultural products are wheat and oats. The nomadic Kirghizes, who form the bulk of the population, are engaged chiefly in stock-raising, and their herds numbered, in 1896, over 3,400,000 head, including nearly 72,000 camels and over 740,000 horses. Fishing is also of some importance. Some of the lakes yield considerable quantities of salt. The manufacturing industries are naturally insignificant, the principal products being leather, tallow, soap, flour, and spirits. In 1897 the population was 685,197. The Mohammedans number over 550,000.

SEMIPALATINSK. The capital of the Territory of Semipalatinsk, in Central Asia, on the right bank of the Irtysh, 2290 miles east-southeast of Moscow (Map: Asia, G 3). It has a

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library, a museum, and a number of mosques. In the vicinity are Tungus ruins with religious inscriptions. The principal products are tallow and leather. Population, in 1897, 26,350.

SEMI-PELAGIANISM. A late designation of a Western heresy of the fifth and sixth centuries, akin to Pelagianism (q.v.). Although Pelagianism itself had been condemned, not a few Christians endeavored to hold an intermediate position between the doctrine of Augustine (q.v), with its accompaniments of original sin, natural depravity, and efficacious grace, on the one hand, and the rather superficial moral-ability theory of Pelagius, on the other. It has been justly observed that these mediators might, with almost equal propriety, have been called Semi-Augustinians. They taught that, although divine grace coöperates with human effort in the process of redemption, and may be kept or lost, according to the choice of each individual, the first inclination to the good and final perseverance may originate with man himself, for Adam's sin did not destroy all ability to seek the good, although it greatly weakened it. Every one may be saved, if he will. Predestination is not unconditional, but depends upon God's foreknowledge. These views first appear in Africa, among the monks, but their great centre was Massilia (Marseilles), in Southern Gaul, whence their advocates were called Massilians. Chief among them were John Cassian (died c.435), Vincent of Lerins (died c.450), and somewhat later Faustus of Riez (died 492), all of whom held positions of honor and influence in the Church. They are typical of the many who highly esteemed Saint Augustine, but could not bring themselves to accept the logical consequences of his theology.

The beginnings of Semi-Pelagianism were observed as early as 428-429; by Prosper of Aquitania, and by him reported to Augustine, with the request that he would lift his voice and pen in opposition. This he did willingly enough in his two works *On the Predestination of the Saints* and *On Perseverance*. Prosper also appealed for aid to Celestine, Bishop of Rome, and the latter promptly issued a letter to the clergy of Gaul, rebuking their dangerous speculations. Among later opponents of Semi-Pelagianism were Avitus of Vienne (died c.525), Fulgentius of Ruspe (died 533), and Cæsarius of Arles (died 543). The controversy is usually regarded as terminated by the adverse decisions of the Synod of Orange (529), over which Cæsarius presided. Its decrees were soon afterwards confirmed by Pope Boniface II.

Subsequent doctrinal history exhibits a wavering of opinion as to the relative value of the two opposing systems associated with the names of Augustine and Pelagius. In the ninth century Rabanus Maurus and Hincmar of Rheims maintained the Semi-Pelagian view against the thorough-going predestinarianism of Gottschalk, and secured his condemnation by synods at Quierzy (849) and Valence (855). The schoolmen and the mendicant Orders carried on the debate with great warmth. In the seventeenth century the Jansenists (q.v.) were vigorously opposed by the Jesuits for reviving so-called Augustinianism, which by that time had become almost obsolete. Among Protestants Melanchthon showed Semi-Pelagian leanings, whence developed the bitter Synergistic controversy (see SYNERGISM), while the Dutch Arminians illustrate a similar conflict of opinion among Calvinists. See ARMINIANISM. Consult: Rainy, *The Ancient Catholic Church*, vol. i. (New York, 1902); Bright, *The Age of the Fathers*, vol. ii. (London, 1903); Harnack, *History of Dogma*, vol. v. (Eng. trans., London, 1898). Consult also the literature cited under PELAGIUS, and see the notices of the advocates and opponents of Semi-Pelagianism mentioned in this article.

SEMIQUAVER. A musical note, represented thus, or in groups thus, equivalent in value to 1-16 of a semibreve, or whole note. The *Practica Musicæ* of Gafurius (Milan, 1496) contains the earliest mention of the semiquaver.

SEMI-QUIETISM. A form of mystical asceticism which, although it adopts the theoretical principle that the most perfect state of the soul is that of passive contemplation, and denies, in certain conditions of the soul, the necessity of prayer or other active manifestations of virtue, yet maintains the incompatibility of this passive contemplation with any external sinful or sensual action. The Semi-Quietists thus differed from the grosser sectaries referred to under QUIETISM.

SEMIR'AMIS. A legendary queen of Assyria. According to Ctesias (in *Diodorus Siculus*, II., i.), she was daughter of the Syrian goddess Derceto (of Ascalon), was exposed as an infant, but was miraculously saved by doves, and became the wife of one of the chief officials and generals of Ninus, King of Assyria and founder of Nineveh. She accompanied her husband on a campaign against Bactra and, by her ingenuity and daring, captured the city. This exploit won the notice of the king, and, captivated by her charms, he demanded her from her husband. The latter committed suicide. Semiramis married Ninus, bore him a son, Ninyas, and ruled as regent after the king's death. She founded Babylon and built the city in its full splendor and magnificence with all its walls, gates, palaces, and temples. She built many other cities, constructed roads and canals, and other great works. She conquered Persia, Egypt, Libya, and Ethiopia, and invaded India, but there her army was defeated and she was wounded in personal combat with the King Stabrobates. Wherever she went she constructed great works, levelling mountains and raising elevations in plains. In time every great work was ascribed to her, so that the land was full of 'the works of Semiramis.' Ultimately her son grew restive under her rule and plotted against her, when she disappeared, in the sixty-second year of her age and forty-second of her reign. Some say she was changed into a dove and became a deity. She is represented as of sensuous character. The story is evidently an epitome of Assyrian history hung upon the names of Ninus and Semiramis, and the Queen herself is in all probability a distortion of Ishtar, the Assyrian goddess of war and love. (See ISHTAR.) According to Herodotus (I., 184), there was a Semiramis queen of Babylonia in the first half of the eighth century, B.C.

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SEMIRYETCHENSK, sā-mē-ryē-chĕnsk'. A territory of Russia in Central Asia, belonging administratively to the Governor-Generalship of Russian Turkestan. Area, over 155,000 square miles (Map: Asia, G 4). It is divided according to the formation of its surface into two parts, of which the southeastern is mountainous, being traversed by offshoots of the Tian-Shan Mountains (q.v.), and the northwestern belongs to the region of the steppes, with sandy stretches along Lake Balkhash. The rivers rise mostly in the Tian-Shan. Mountains and flow into Lake Balkhash. The chief of them is the Ili, which is also the principal navigable waterway of the territory. The principal lakes are Balkhash (q.v.) and Issik-kul (q.v.). The climate is continental. The winter is extremely cold and the summer, which follows a brief spring, is hot and dry. In the mountainous portions are found gold, salt, and alabaster. Much of the lower part of the territory is fertile agricultural land which becomes very productive when irrigated. The crops in the northwest consist mainly of wheat, oats, and oleaginous plants. Agriculture, however, is as yet of secondary importance, as the nomadic Kirghizes, the predominating element of the population, are engaged almost exclusively in stock-raising. Population, in 1897, 990,107, of whom the Kirghizes constitute three-fourths. Capital, Vyerny (q.v.).

SEMITES. A name used to designate a certain group of peoples whose close kinship is revealed by many physical and mental characteristics, but especially by language and religion. The term is derived from the table of nations in Genesis x., in which the eponym heroes of some Mediterranean peoples known to the authors are represented as descendants of the three sons of Noah, Shem, Ham, and Japhet (qq.v.). But, as a matter of fact, all the nations here grouped under Shem are not akin; some of the peoples arranged under Ham are evidently kinsmen of the leading nations reckoned as descendants of Shem, and some peoples are mentioned under both Shem and Ham. Historical and geographical reasons seem to some extent to have prevailed in the arrangement. But in spite of the inexact classification in Genesis x., the term 'Semites' has been retained for the sake of convenience in preference to other designations which have been proposed, such as 'Syro-Arabians' or simply 'Arabs.' As it is now used, it indicates Babylonians, Assyrians, and Chaldeans; Phœnicians, Carthaginians, and other Canaanites; Israelites, Edomites, Moabites, and Ammonites; Arameans; Arabians and Ethiopians.

As to the original home of these Semitic peoples there is a preponderance of opinion in favor of Arabia or Africa. On the other hand, recent discoveries have tended to revive the idea of a Babylonian origin. Certain customs, possessions, and achievements of the early Egyptians exhibit a marked similarity to those of their contemporaries in Babylonia. Some scholars find it most natural to explain the introduction of metals, domestic animals, a peculiar mode of burial, and the use of brick in a land where stone is found in plenty, by the immigration into the Nile Valley of a Semitic race that once lived in Babylonia. Closer examination, however, has shown the identity of the Neolithic race in Egypt with the dynastic Egyptians. The close affinity ethnologically between the Egyptians and the other so-called Hamitic peoples, such as the Libyans, the Berbers, the Cushites, the Gallas, the Danakils, and the Somali, renders it improbable that the Egyptians were immigrants from Asia. Nevertheless, the kinship of the North African languages with the Semitic speech is unmistakably shown in numerals and prepositions, noun formation and verb inflection, syntax, and morphology. (See SEMITIC LANGUAGES.) Some scholars have therefore drawn the conclusion that the Semites are likely to have lived originally in Africa, though not as differentiated Semites, and to have crossed into Arabia by Bab el-Mandeb or Suez, where in new surroundings and seclusion their characteristic peculiarities may have developed. From Arabia succeeding waves of emigration sent Semitic nomads into Babylonia, Mesopotamia, and Syria. The invasion of Babylonia must have occurred very early, since already in the fifth millennium B.C. the influence of the Semitic speech is seen in the Sumerian language (q.v.) and the religious conceptions of Babylonia in the fourth millennium reflect conditions of society no longer prevalent in the time of the Minæan Empire. (See MINÆANS.) It is impossible to date with certainty the invasion of Syria, but there is a tradition that brings the foundation of some Phœnician cities back to the first half of the third millennium B.C. (see PHŒNICIA), and there is no reason to doubt that Palestine attracted the Semitic nomads even at an earlier time. How soon the tribes subsequently developing into the nations of Israel, Edom, Moab, and Ammon drifted into Syria cannot be determined. Some passages in the Amarna letters written about B.C. 1400 mentioning the *Habiri*, possibly a cuneiform equivalent of *'Ibiri*, Hebrews, seem to refer to them. Arameans had settled in Mesopotamia and Babylonia at least as early as the thirteenth century B.C., and Chaldæans are found in the neighborhood of the Persian Gulf not much later. Semites speaking a decidedly Sabæan dialect seem to have lived in Abyssinia in the seventh century B.C. and probably long before that time. See ETHIOPIA.

The Semites belong to the white Caucasian race. Physically, the Semitic type has probably maintained itself most pure in Arabia. In Babylonia it is likely to have been modified by the Sumerians, in Assyria by the Gutians, in Mesopotamia by the Mitanians and Hittites, in Syria by the non-Semitic aborigines, in Abyssinia by Hamitic tribes, in Carthage by the Berbers. During the period of the caliphs the Arabs in the conquered lands intermarried with the nations and the mixture of blood was increased by the harem life. Nevertheless, there are certain unmistakable physical characteristics of the Semitic race, such as a tendency to prognathism, fullness of lip, an aquiline nose, and wavy or curly hair.

It is widely held that the Semitic mind is analytical rather than synthetical, practical rather than speculative, inclined to occupy itself with details rather than with generalizations; the race excels in commerce and industry rather than in warfare and statecraft, in morals and religion rather than in science and art. In the main this estimate is probably fair. There are not wanting scholars, however, who look upon it as a one-sided characterization. In order to reach a comprehensive and well-balanced judg-

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ment their arguments must be given due attention. The fact that Semitic speech avoids the formation of compounds is no doubt a most significant indication of an analytical rather than synthetical tendency; and the marked capacity for keen analysis coupled with a striking inability to systematize knowledge, seen in the Arabic philosophers not less than in the Talmud, is in harmony with this. Nevertheless, there is force in the argument that three monotheistic religions created by this race indicate a deep sense of unity and a remarkable power of synthesis. It should be observed, however, that monotheism with the Semites is not so much a result of processes of ratiocination as of the concentration of worship upon one god. The correctness of ascribing to them a certain sober, matter-of-fact way of reasoning may not be seriously questioned on the ground of allegorizing common among Hellenistic Jews, the curious flights of Cabalists from the solid ground of reality, or the speculations of some Arabic and Jewish philosophers of the Middle Ages, since in these instances it is necessary to reckon largely with infusions of foreign blood and foreign thought. To what extent the mythical lore of Babylonia was the creation of Semites and not of their predecessors, the Sumerians (see SUMERIAN LANGUAGE), is difficult to determine. Our most prolific sources do not reveal the wealth of myths once no doubt flourishing in Syria and Arabia; they are late and are written either from the standpoint of monotheism interested in the suppression or transformation of the myths, or from the standpoint of rationalism interested in translating them into history. Much weight must be attached to the peculiar idealism that so often manifests itself among the Semites in prophetic enthusiasm and devotion to lofty aims promising no immediate returns. It is indeed to be observed that the prophetic outlook is most sober where it is least affected by foreign movements of thought; and it cannot be denied that the cases of love of the ideal for its own sake become more striking by contrast with the prevailing devotion to a certain cause because of the tangible reward it will bring.

To the growth of political life the contributions of the Semite do not appear to have been very great. His attitude is that of the Orient as distinct from the Occident, and there is less difference between him and the Persian than between the Persians and their kinsmen, the Greeks. The superiority of the Semite as a trader is not wholly due either to a survival of nomadic habits or to the social conditions of an exile from home not permitted to engage in agriculture. Cuneiform inscriptions reveal an extraordinary development of commercial relations, including banking, contracts, deeds, bookkeeping and the like, in ancient Babylonia among a settled people, whose land was carefully cultivated. Such peoples as the Arameans settled in Mesopotamia; the Yemenites, the Edomites, and the Phœnicians were great traders. From Carthage, Rome secured her text-books on agriculture; yet Carthage was even more famous for her commerce. No doubt the heaviest debt that science owes to the Semites is for faithful transmission of knowledge originally won by others. Babylonians, Arameans, Arabs, and Jews have done yeoman service as intellectual brokers. It should not be questioned, however, that they have added not a little to the precious burdens they have carried down the ages, especially in astronomy, mathematics, chemistry, anatomy, and philology. At least one Arabic historian, Ibn Khaldun, deserves to be ranked with the greatest interpreters of history in any age.

To what extent religious protests against images prevented a normal development of native capacities for the plastic arts cannot be known. The statues found at Telloh can probably not be claimed for the Semites. They give the impression of being the ripe fruits of a long growth among the Sumerians. It can scarcely be an accident that such works of art are not found in later periods of undoubted Semitic dominance. The Assyrians certainly excelled in the representation of animals, but do not seem to have developed otherwise a high artistic taste. The representations of the human figure on South Arabian monuments are exceedingly crude. It is chiefly in the arabesque, based upon mathematical motives, that the Semitic art achieved a distinct triumph. There is reason to suppose that music may have reached a comparatively high degree of development among the ancient Semites. Unfortunately, it is not possible to determine its exact character. The Semitic race has never produced a great drama or epic poem. But the Semite excels in lyric poetry. The finest examples are the Book of Job (q.v.) and the poems of Heine (q.v.), though the Psalms, Canticles, and the Muallakat furnish some passages of genuine inspiration. This tendency also created an elevated prose or semi-poetry found in oracles, as in the prophetic writings and the Koran, often with a definite metre and a simple rhyme. There have been great philosophers among the Semites such as Philo, Ibn Gabirol, Maimonides, Spinoza, Avicenna, and Averroes, but their contributions are indicative of the influence of foreign speculation rather than representative of native tendencies of thought, finding expression through these men of genius.

On the other hand, it may be questioned whether the sense for conduct and the genius for religion accredited to the Semites have not to some extent been exaggerated. It is true that so early a production as the Code of Hammurabi (q.v.) exhibits surprisingly advanced ethical conceptions. The legislative codes of Israel, especially Deuteronomy (q.v.), show much concern for the poor, the weak, and the slaves, and seek to safeguard the sanctity of the family, and the commentaries on the Law in the Mishna and the two Talmuds reveal a sturdy moral sense endeavoring to apply the Law to the various conditions of life without making the burdens too heavy. The great prophets put the emphasis very strongly on the moral requirements, equity, justice, and mercy. In their spirit Jesus gave paramount importance to the inner disposition and made love the fulfillment of the law. South Arabian inscriptions show a deeper consciousness of sin as well as a keener religious sense in general than the secular songs of a late syncretistic period had led men to expect. And the moral earnestness of Mohammed himself and many followers of this prophet must be recognized. But no Semitic people ever conceived of such a marvelous adjustment of character and destiny as the Indian doctrine of metempsychosis presents. The emphasis upon truthfulness seems

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stronger among the Persians. The uncompromising rectitude of spirit that led the Teuton to involve Odin himself in the twilight of the gods because of his moral delinquencies is only approached in the Book of Job. Yahweh may repent of what he has done, but he is not punished for his errors. Without the impact of ideas essentially foreign to his native modes of thought, and recognized as such by his kindred, no Semite has ever risen to the conception of moral autonomy. The question why one course of action should be preferred to another has been universally answered by the Semite by reference to a law imposed from without. This dependence upon an external authority for a standard of right has no doubt strengthened the religious feeling. Another cause of religious fervor has been sought in the institution of polyandry which apparently prevailed among the early Semites to a greater extent than among any equally gifted race, and continued, long after another type of marriage had taken its place, to exercise its influence in the worship of a mother-goddess who freely gives herself even to human lovers. A religious mysticism ultimately based upon such a conception of sexual relationship poured a wealth of tenderness and devotion into the worship of the supreme tribal god and remained an important factor long after the mother-goddess cult had ceased. That the Semite possesses a capacity for intense religious faith is manifest; the name of Jesus would alone prove this. He was preceded and followed by many prophets in Israel; but Mohammed is the only important witness to the power of the religious feeling in the home of all the Semites. The fact that monotheism was reached by Jews and Arabs, not by reasoning, but by faith in and devotion to the tribal god, is itself a testimony to the hold religion had on these people. Nevertheless, it is impossible to escape the impression that neither the consciousness of the unity of the divine life, nor the sense of mystic union with the divine, nor the devotion to a divinely ordained mode of life, was ever so universal or so intense among the Semites as it has been in India. If the Semites are to us the people of religion *par excellence* it is because through the prophets of Israel, and preëminently through the founder of Christianity, a form of religion has found its way into the world which, independent of cultic performances and changing intellectual apperceptions, presents high ethical motives and ideals touched with a sense of the infinite mystery and sacredness of life.

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SEMITIC LANGUAGES. The current designation of a group of languages sharply marked off from other groups by certain characteristic features pertaining both to morphology and to lexicography. The name Semitic is an unfortunate one, derived from the classification of nations in the tenth chapter of Genesis. (See SEMITES.) In retaining it we must not only bear in mind that it is a purely conventional designation for a certain group of languages, but also distinguish between its ethnic and linguistic applications. It does not follow that nations speaking the same languages belong necessarily to the same stock.

Confining ourselves to the linguistic application, we may distinguish two chief branches of Semitic speech—a northern and a southern. To the northern branch belong (1) the Babylono-Assyrian; (2) the Aramaic, subdivided into a western and an eastern branch (see ARAMAIC); (3) Hebræo-Phœnician. To the southern branch belong (1) the Arabic, which again is divided into north and south Arabic, and (2) Ethiopic.

In comparison with the territory throughout which the Indo-Germanic languages are spoken the area of Semitic speech is exceedingly limited. Excluding the modern Hebrew and modern Arabic, which have been carried by Jews and Arabs to distant parts, the Mediterranean and the Euphrates, the Indian Ocean and the Taurus range represent the western, eastern, southern, and northern boundaries for the groups of Semitic languages. As a direct consequence of these narrow confines, the relationship of the various Semitic languages to one another is much closer than is the case with the various Aryan groups (e.g. Persian and Teutonic); it is almost justifiable to call them dialects rather than separate languages.

The chief traits characterizing the Semitic languages are: (1) Within the historical period of the languages, the triliteral character of most of the stems underlying both nouns and verbs; (2) in the morphology, the constant character of the consonants forming the stems, the vowels being used to indicate the variations on the main theme; (3) substantial agreement in the noun and verb formation; (4) the arrested development in the expression of time relation in the case of the verb, which does not pass beyond the differentiation between a completed and an incompleted act; (5) the use of certain consonants in all the languages (particularly h, n, sh, t) for pronominal prefixes and suffixes and for indication of plural and feminine, as well as variations of the verbal stem corresponding in a measure to modes in Indo-Germanic languages. Other traits might be mentioned, such as the paucity of auxiliary particles, more particularly conjunctions; and it should be noted that while the Semitic languages agree closely in having the same words for common terms (such as father, mother, brother, water, food, deity, heaven, etc.), there are, however, notable exceptions (e.g. man); and in the case of verbs there is considerable individuality manifested in the specific meanings developed by each language from the very general one which is usually attached to a particular stem.

In the form of writing employed there is even more variation, no less than three distinct species being employed in the groups comprising the Semitic languages: (a) the cuneiform char-

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acters of Babylonia and Assyria, which, originating in a pictorial script, became linear or wedge-shaped (see CUNEIFORM INSCRIPTIONS); (b) the Phœnician and its derivatives, Hebrew, the various Aramaic alphabets, and further derivatives from the latter; the Syriac and Arabic alphabets; the Phœnician itself may revert to the characters found in the south-Arabic inscriptions; (c) the Ethiopic, which may likewise be a derivative of the ancient south-Arabic (Sabæan and Himyaritic) alphabet, though other factors have entered into the production of some of the peculiarities presented by the Ethiopic alphabet. See ALPHABET; INSCRIPTIONS.

Of the various groups of the Semitic languages, the Babylono-Assyrian merits the first place by virtue of the antiquity of its literature. The excavations in Babylonia and Assyria (q.v.) have brought to light inscriptions that date back to about B.C. 4500 and as early as B.C. 2500 there appears to have existed quite an extensive literature, chiefly historical, legal, and religious. Later we find other branches like medicine and astronomy represented. Assyria adopted the script together with the general culture of Babylonia, and while it made few contributions to the literature outside of annals, prayers, and incantations, great care was taken by some of the kings to copy and preserve the literature produced in the south. The cuneiform characters in various modifications continued in use in Mesopotamia until a few decades prior to the present era.

The Aramaic branch is distinguished by the large number of its subdivisions and dialects and by the large territory over which these subdivisions and dialects are spread at a comparatively early period. The extensive sway of Aramaic is almost coequal with the range of Semitic speech, and some of the Aramaic dialects developed sufficiently distinct traits to fall within the category of separate languages. By far the most important representative of the group is the Syriac, or the Aramaic dialect spoken in Edessa, Harran, Nisibis, and other places in Mesopotamia. The Babylonian dialect of the Aramaic was adopted by the Jews of the Exile; its form in the period A.D. 250-450 may be seen in the Babylonian Talmud. A similar dialect, though less exposed to foreign influence, was the Mandaic. The Aramaic dialect spoken in Judea has been preserved in the Bible (portions of Ezra and Daniel) and in the earlier Targums. Another Aramaic offshoot is the Samaritan, being the dialect spoken in the district of Shechem, and of importance as the tongue of the Samaritan community. The Galilean dialect, as it was spoken in the third century A.D. and later, has been preserved in many Targums and in the Babylonian Talmud. For further detail concerning these languages and their literatures, see the articles ARAMAIC; SYRIAC; MANDÆANS; SAMARITANS.

In the Hebræo-Phœnician group, the Hebrew merits the first place by virtue of the fact that the bulk of the Old Testament is written in this language. (See article JEWS, sections *Hebrew History* and *Language and Literature;* also HEXATEUCH; PENTATEUCH.) Hebrew literature is also represented by the older division of the Talmud known as the Mishna (q.v.), containing the codification of the Rabbinical laws. This section of Hebrew literature was edited about A.D. 200. A number of Midrashim are likewise written in this Neo-Hebraic speech. By this time Hebrew had long ceased to be the current speech of Jews, who in Palestine had adopted Aramaic, and outside of Palestine the language of the countries in which they were settled, but Hebrew still maintained its sway as the tongue of sacred writ and as the official language of the synagogue. In view of this it continued to be cultivated not only by the learned, but by the masses as well, so that from time to time Hebrew witnessed literary revivals. Such a revival took place in Spain in the eleventh and twelfth centuries, and again in Russia and Eastern Europe in the nineteenth century, so that numerous works in Hebrew continue to be published up to the present time. The Hebrew of the Middle Ages and the Neo-Hebrew are modeled entirely upon the biblical style; and, since it is artificially cultivated and nowhere used as the sole language of interchange, it can hardly be designated as one of the living Semitic languages. Hebrew being merely the Canaanitish speech adopted by the Israelites upon taking possession of Canaan, it follows that it is practically identical in its earliest form with Phœnician, since the Phœnicians are merely Canaanites who settled on the shore instead of in the interior of Palestine. The Phœnicians do not appear to have developed any literature, and the language is known to us only from the vast number of mortuary and votive and commemorative inscriptions found in Phœnicia itself, and in even larger quantities in the colonies of the Phœnicians, notably in Cyprus, Northern Africa, Sardinia, Malta, Southern Spain, and Southern France. These inscriptions cover the long period from about the eighth century B.C. up to the end of the second century of our era. Their interest is chiefly (1) epigraphical in enabling us to trace the development and modifications of the Phœnician script, and (2) linguistic as furnishing the means to the study of a Semitic tongue that was the first to spread outside of Semitic territory. (See PHŒNICIA.) Presenting only slight variations from the Hebrew and Phœnician is the Moabitic, represented by a single inscription of the Moabitic King Mesha (see MOABITE STONE), and which is of special interest as representing the oldest alphabetical inscription in ancient Phœnician or Canaanitish script.

Of the southern branch the chief representative is the Arabic, the Semitic language which has far exceeded all others in the wide character of its influence. It was the rise and spread of Islam that gave to Arabic as the language of the Koran its supreme importance. Previous to that time Arabic was confined to the peninsula of Arabia; several dialects prevailed, and the one that became the classical speech was the form spoken in Mecca, the birthplace of the Prophet Mohammed. Leaving southern Arabic out of account for the present, Arabic literature previous to Mohammed was confined to poetical compositions which were preserved orally. Islam marks not only a religious innovation, but was also an intellectual movement that gave rise to written literature among the Arabs, and as the Arabs came into contact through the spread of Islam with the existing Oriental and Occidental cultures, the various branches of science, medicine, philosophy, theology, mathematics, geography, history, besides poetry, were cultivated

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and an exceedingly extensive and important literature was produced in Arabic during the five centuries following the appearance of Mohammed. After that period a decline set in, though the literary activity of the Arabs never came to a standstill, and within the past fifty years, through contact with modern European culture, a new era of intellectual activity has been inaugurated among the Mohammedans in Turkey, Egypt, and India, which appears to be spreading to other centres of Islam. (See ARABIC LANGUAGE AND LITERATURE.) The culture of Southern Arabia is far older than that which arose in Central and Northern Arabia. As early at least as B.C. 1500 a powerful kingdom existed in Yemen, and although no literary remains have been preserved, inscriptions in large numbers have been found, revealing a distinctive variety of Semitic script as well as a distinctive species of Arabic which is commonly termed Sabæan or Himyaritic. The relationship of the south-Arabic script to the Phœnician is a problem that has not yet been cleared up. Much speaks in favor of regarding the former as the prototype of the latter, though the links leading from the one to the other are missing. The south-Arabic inscriptions covering a period of about 700 years (so far as they can be dated at all) are chiefly of a votive or commemorative character, and throw light upon the history and religion of the old south-Arabic kingdoms that at one time played no inconsiderable rôle. See INSCRIPTIONS; MINÆANS; SABÆANS.

The Ethiopic literature in the proper sense, or the Geez (to use the native name), dates from the introduction of Christianity into Abyssinia. That literature is almost exclusively religious and consists mainly of homilies, religious poetry, and lives of saints, besides some chronicles. The language survives in several dialects (Tigre, Tigriña, Amharic) spoken in Abyssinia. The alphabet, derived from the south-Arabian script, presents the peculiarity that the vowel sounds are indicated by modifications of the consonants which they accompany. See ETHIOPIA; ETHIOPIC WRITING; AMHARIC LANGUAGE.

Many attempts have been made, sometimes in a very superficial fashion and sometimes by the use of scientific methods, to establish a relationship between the Semitic languages and the Indo-Germanic. But all these endeavors have failed. On the other hand, the Semitic languages bear so striking a resemblance in some respects to certain languages of Northern Africa, that the existence of some relationship between the two groups may be assumed. These languages belong to the family sometimes called 'Hamitic,' and composed of the Egyptian, Berber, Beja (Bishari, etc.), and a number of tongues spoken in Abyssinia and the neighboring countries (Agau, Galla, Dankali, etc). Some of the indispensable words in the Semitic vocabulary (as, for instance, 'water,' 'mouth,' and certain numerals) are found in Hamitic also, and these words are such as cannot well be derived from triliteral Semitic roots, and are more or less independent of the ordinary grammatical rules. Important resemblances in grammar are also noted—for example, the formation of the feminine by means of *t* prefixed or suffixed, that of the causative by means of *s*, similarity in the suffixes and prefixes of the verbal tenses, and, generally, similarity in the personal pronouns, etc. There is also much disagreement; for instance, the widest divergence is found in the mass of the vocabulary. The question is involved in great difficulties. Isolated resemblances may have been produced by the borrowing of words. But the great resemblances in grammatical formation are harder to explain as due to borrowing on the part of the Hamites, more especially as these points of agreement are also found in the language of the Berbers, who are scattered over an enormous territory, and whose speech must have acquired its character long before they came into contact with the Semites.

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SEMITONE (Lat. *semitonium*, half tone, from *semi-*, half + *tonus*, tone). In music, the smallest interval in the diatonic scale, as E F or B C, in which the ratio is as 15 to 16. In the pianoforte, the interval between any two notes between which no other note is interposed, as C to C♯, or B♭ to B, is a semitone.

SEMLER, zĕm'lĕr, JOHANN SALOMO (1725-91). One of the most influential German theologians of the eighteenth century. He was born at Saalfeld, where his father was archdeacon. He was educated at Halle, and in 1752 was appointed professor of theology there. Semler, in the early part of his career, was influenced by Pietism, but later he adopted a moderate rationalism, of which he was the first systematic exponent. His principal works are: *Apparatus ad Liberalem Veteris Testamenti Interpretationem* (1773); *De Dæmoniacis* (1760); *Umständliche Untersuchung der dämonischen Leute* (1762); *Versuch einer biblischen Dämonologie* (1776); *Commentationes Historicæ de Antiquo Christianorum Statu; Observationes Novæ quibus Historia Christianorum usque ad Constantium Magnum Illustratur* (1784). Consult his autobiography (Halle, 1781-82); Schmid, *Die Theologie Semlers* (Nördlingen, 1858).

SEMLIN, zĕm-lĕn' (Hung. *Zimony*). A city in Croatia-Slavonia, Hungary, situated at the junction of the Save and Danube, opposite Belgrade, Servia (Map: Austria, G 4). Noteworthy edifices are the German theatre, and the ruined castle of Hunyady, the Hungarian hero, who died here in 1456. Semlin is the centre of the Turco-Austrian transit trade. Population, in 1900, 14,416.

SEMMERING, zĕm'ĕr-ing. A pass in the Semmering Alps, Austria, crossed by the railroad from Gloggnitz in Lower Austria (47 miles by rail southwest of Vienna) to Mürzzuschlag in Styria, a distance by rail of 33 miles. The

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elevation of the pass is about 3300 feet. There was a bridle path over it as early as the beginning of the thirteenth century. The beauty of the scenery and the desirableness of the climate make this one of the most frequented of the health resorts in the Austrian Alps. The railway, the first of the great Continental mountain railways, and still considered a remarkable engineering feat, was completed in 1854. It has 15 tunnels and 16 viaducts.

SEMMES, sĕmz, RAPHAEL (1809-77). An American naval officer, born in Charles County, Md. In 1832 he entered the United States naval service as a midshipman. He studied law, and was admitted to the bar in 1834, but remained in the navy. During the Mexican War he was the flag lieutenant under Commodore Connor of the Gulf Squadron, and commanded a shore battery at Vera Cruz. After the war he was made inspector of lighthouses, became commander in 1855, and in 1858 was secretary of the Lighthouse Board. He resigned from the navy on February 15, 1861, and soon afterwards was commissioned by President Davis of the Confederate States to secure skilled mechanics and military supplies in the North. On April 18, 1861, he was commissioned commander in the Confederate Navy, and soon went to New Orleans to fit out the *Sumter*, which escaped from the port and captured seventeen prizes before she was blockaded in Tangier by two American ships in January, 1862. Semmes then sold the *Sumter*, and in August, 1862, at the Azores, took command of the *Alabama*, which became the most noted of the Confederate 'commerce-destroyers.' (See ALABAMA CLAIMS.) On June 19, 1864, the *Alabama* engaged the United States ship *Kearsarge* off the coast of Cherbourg, France, and was sunk. Captain Semmes was picked up by the English yacht *Deerhound*, was taken to England, and soon afterwards returned to the Confederate States. He was appointed rear-admiral and was placed in charge of the James River Squadron. When Richmond was evacuated, the ships were blown up, and Admiral Semmes was commissioned brigadier-general and put in charge of the defenses of Danville, Va. Upon General Lee's surrender, he joined Gen. Joseph E. Johnston, with whom he surrendered. While practicing law at Mobile, Semmes was arrested December 15, 1865, by order of Secretary Welles, on charges of treason, but was released by the third amnesty proclamation of President Johnson. He published *Service Afloat and Ashore During the Mexican War* (1851); *Campaigns of General Scott in the Valley of Mexico* (1852); *Cruise of the Alabama and Sumter* (1864); and *Memoirs of Service Afloat During the War Between the States* (1869).

SEMOLINA (It. *semolino*, grits, soup paste, small seed, diminutive of *semola*, bran, from Lat. *simila*, fine wheat flour), SEMOLA, or SEMOULE. A by-product in wheat-flour making, especially from hard wheats, being the particles retained in the bolting machine and used for thickening soups, for puddings, etc. It is widely used in the manufacture of macaroni, etc. It is also manufactured in considerable quantity, as it is a favorite food in Italy and France. Its average percentage composition is: water, 13.1; protein, 9.4; fat, 0.9; nitrogen-free extract (chiefly starch), 76.2; and ash, 0.4. See "Manufacture of Semolina and Macaroni," *United States Department of Agriculture, Bureau of Plant Industry, Bulletin 20* (Washington, 1902).

SEMPACH, zĕm'päG. A small town of Switzerland, situated on the east shore of the Lake of Sempach, northwest of Lucerne. Population, in 1900, 1,026. At Sempach took place the second great conflict between the confederated Swiss cantons and the House of Hapsburg. The renewal of the strife was due chiefly to the encroachments of the Swiss upon Hapsburg territory. The Hapsburg army, led by Duke Leopold in person, consisted of 4000 horse and 1400 foot, while the Swiss are said to have numbered only 1,300 men. The latter won a complete victory, as is claimed, through the heroic self-sacrifice of Arnold von Winkelried (q.v.). Duke Leopold and 1400 nobles were slain. A chapel and a monument mark the battlefield.

SEMPER, zĕm'pĕr, GOTTFRIED (1803-79). A German architect. He was born at Hamburg, November 29, 1803, and after devoting himself to the study of law at Göttingen, took up architecture, principally under Gau at Paris. His travels in Italy, Sicily, and Greece led to his writings on the practice of polychromy by the Greeks, which aroused much discussion. In 1834, upon the recommendation of Schinkel, he was appointed professor of architecture in the Academy of Dresden. There he built the Royal Theatre, the new Synagogue, besides several private residences, and had just begun the New Museum, when his participation in the Revolution of 1849 compelled him to leave the city. He first went to Paris, and in 1851 to London, where his advice was of great weight in the reform of industrial art instruction, and in the organization of South Kensington Museum. In 1855 he accepted a call to the professorship of architecture in the newly organized Polytechnicum at Zurich, for which he designed the building. It is one of his masterpieces, simple and stately in style, and beautifully decorated, after his design. While at Zurich he also designed the railroad station, the Kurhaus at Baden, and the town hall at Winterthur. The theatre at Dresden, which had in the meanwhile been burned, was rebuilt after his plans in 1871-78, with increased splendor, under supervision of his son Manfred. In 1871 he was called to take part in the architectural reconstruction of Vienna, the Imperial Palace, the new theatre, and the two museums being allotted him. He died at Rome, May 15, 1879.

No architect of modern times was more thoroughly versed in the forms of the Italian Renaissance, and understood how to adapt them so well to present-day needs. His buildings are as harmonious in design as they are careful and excellent in detail. He was also a distinguished writer upon architectural subjects. Among his chief works are: *Ueber Polychromie und ihren Ursprung* (Braunschweig, 1851); *Wissenschaft, Industrie und Kunst* (ib., 1852); and his masterpiece, *Der Stil in den technischen und tektonischen Künsten* (Stuttgart, 1878). His plans and sketches were published after his death (Leipzig, 1881). Consult his biography by Lipsius (Berlin, 1880), and Hans Semper (Dresden, 1880).

SEMPER, KARL (1832-93). A German zoölogist, born at Altona. He studied at Würz-

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burg, and in 1858 he went to the Philippines, where he traveled until 1864. Returning to Germany, he taught at Würzburg, and in 1872 became director of the zoölogical museum and laboratory. In 1877 he gave a course of lectures at Boston which were afterwards published under the title of "Animal Life as Affected by the Natural Conditions of Existence" (New York, 1881). Semper's work as a systematic zoölogist is embodied in his series of volumes on the zoölogy of the Philippines; as an embryologist he will be remembered for his work on the development of a fresh-water mollusk (Ampullaria); as a morphologist he actively advocated the theory of the derivation of the vertebrates from the annelid worms, a view now generally held. Still more important are his broad and original views on evolution as stated in his *Animal Life*. He also criticised Darwin's theory of circular coral reefs (atolls), his views having been confirmed by other later observers.

Semper's chief works, besides the *Animal Life*, are: *Die Philippinen und ihre Bewohner* (Würzburg, 1869); *Die Palauinseln* (Leipzig, 1873); *Reisen im Archipel der Philippinen* ("Wissenschaftliche Resultate," part i., 1868; ii.-vi., 1870-96); "Beiträge sur Biologie der Oligochaeten," in *Arbeiten aus dem zoologisch-zootomischen Institut in Würzburg* (1877); "Das Urogenital-system der Plagiostomen," etc., in *Arbeiten*, etc., vol. ii. (1875). Semper was also the founder of the zoölogical periodical *Arbeiten aus dem zoologisch-zootomischen Institut in Würzburg* (1871-95).

SEM'PILL, ROBERT (c.1530-95). A Scottish ballad writer, who wrote many broadsides in support of the Reformation in Scotland. For them consult: *The Sempill Ballates*, ed. by Stevenson (Edinburgh, 1872); and *Satirical Poems of the Time of the Reformation*, ed. by Cranstoun (Scottish Text Society, 2 vols., ib., 1889-93).

SEN, KESHUB CHUNDER (1838-84). A Hindu reformer and theist. He was born at Garifa, Bengal, and received a mixed native and English education. He came into prominence in connection with the Theistic Church of India or the Brahmo-Somaj (q.v.), which he joined in 1857. In 1865 a division resulted, and the majority became known as the 'progressive Somaj' with Sen as the acknowledged leader. Although acknowledging the moral precepts of Christ, they demanded for India a Christ presented in Oriental form for the Hindu mind. In 1870 he visited England, where he was cordially received by scholars and ecclesiastics. When, in 1878, however, Sen, who had been one of the prime movers in the passage of the law against child marriage, permitted his daughter, thirteen years old, to wed the Rajah of Cutch Behar, he was deposed by some of his congregation and thenceforth his personal prestige declined. The dissenters formed the Sadhara or Cothetic Brahmo-Somaj. In 1881 he celebrated what he called the birth of the New Dispensation, promulgating the teachings which he had imbibed from Ramakrishna (q.v.). He was the author of *Yoga, Objective and Subjective* (1884). Consult: Max Müller, *Biographical Essays* (London, 1884); Mozoomdar, *Life and Teachings of Keshub Chunder Sen* (Calcutta, 1887).

SENANCOUR, se-nän'köor', ÉTIENNE PIVERT DE (1770-1846). A French philosopher and littérateur, remembered almost solely as the author of *Obermann*. He was born in Paris of a noble family ruined by the Revolution. He was sickly from childhood. Though destined to the Church, he escaped from the Seminary of Saint-Sulpice to Switzerland, with his mother's help, and married there. He returned to Paris after his wife's death, about 1800, and remained there in poverty, relieved at the last by a modest pension, till his death at Saint Cloud. His more noteworthy works besides *Obermann* (1804) are *Rêveries sur la nature primitive de l'homme* (1799), *De l'amour selon les lois primordiales* (1805), *Observations sur le génie du christianisme* (1816), and a feeble romance, *Isabelle* (1833). *Obermann* alone "has qualities which make it permanently valuable to kindred minds" (Matthew Arnold). In form a novel, it is in fact a series of melancholy reflections on nature and society, with the morbid sentiment of the romantic generation of 1830. Senancour found self-forgetfulness only in nature, his descriptions of which are often beautiful. *Obermann* is translated with a biographical and critical introduction by A. E. Waite (New York, 1903).

SENART, se-när', ÉMILE CHARLES MARIE (1847—). A French Orientalist, born at Rheims. He studied Sanskrit in Munich and Göttingen, and except for a short period of political activity devoted himself entirely to the languages and literature of India. His most famous work, *Essai sur la légende du Bouddha* (1875-82), advanced the theory that the tradition in regard to Buddha represents an old sun myth. Senart's other works include *Kaccayana et la littérature grammaticale du Pâli* (1871), *Les castes dans l' Inde* (1896), and an edition of the *Mahavastu* (1892-98).

SENATE. The name commonly applied to the upper chamber of a legislative body. See government sections under UNITED STATES; FRANCE; ITALY; SPAIN. See also CONGRESS; COMMITTEES.

SENATOR, zä-nä'tôr, HERMANN (1834—). A German physician, born in Gnesen and educated in Berlin. He became professor of clinical medicine at Berlin and principal physician of the Augusta Hospital in 1875, and six years afterwards directing physician in the Charité Hospital. His works are: *Untersuchungen über den fieberhaften Prozess und seine Behandlung* (1873); *Die Albuminurie im gesunden und kranken Zustande* (1881 and 1890), *Die Krankheiten des Bewegungsapparats und Diabetes mellitus und insipidus* (1879); and *Die Erkrankungen der Nieren* (1895).

SENATORIAL COURTESY. The term applied to a custom in the United States Senate by which the procedure of that body is based chiefly on the honor of Senators rather than upon strict rules such as exist in the House of Representatives. Thus it is a part of Senatorial courtesy that a member shall not be interrupted in the course of a speech on the ground that his time has expired, but may speak without limit. It is a part of the same custom that personal requests of Senators, as for the immediate consideration of a favorite measure, shall be granted. It has also come to be a part of Senatorial courtesy that the Senate will refuse to confirm the nomination of an appointment to office in a State

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whose Senators object to the person nominated. The result of this unwritten rule often makes it necessary for the President to consult beforehand with the Senators from a State in which he is called upon to make an appointment.

SENCI, sān'sê. A warlike tribe of Panoan stock (q.v.), occupying the hill country east of the Ucayali River, about Sarayacu, Northeastern Peru. They are described as among the greatest warriors of the Ucayali region, and bold and generous in disposition. Their weapons are the bow, lance, club, and *kowas*, a sort of combined club and stabbing instrument. They are agricultural and very industrious.

SENDAI, sēn'dī'. The capital of the Prefecture of Miyagi, Japan, situated near the eastern coast of Hondo, 217 miles by rail north of Tokio (Map: Japan, G 4). It is noted as the former seat of the Daimyo Date Masamune (1567-1636), who sent an embassy to the Pope and the King of Spain in 1614. His castle, somewhat damaged during the revolution of 1868, is now used by the garrison. The principal products are ornamental articles of fossil wood, found in the vicinity, and cloth. Population, in 1898, 83,325.

SEN'ECA. One of the leading tribes of the Iroquois (q.v.) confederacy. The popular name is foreign to the tribe and of uncertain origin. They call themselves *Tshoti-nondawaga*, abbreviated *Nondowaga*, 'people of the hill,' and were formerly known to the French as *Tsonnonthouan*. In the Iroquois councils they were officially designated as the 'doorkeepers,' in allusion to their guarding the western 'door' or frontier of the confederacy. The Seneca were the ruling spirits of the Iroquois league in the west, as the Mohawk were in the east, and the wars waged with the Huron, Neutral Nation, Erie, and Illinois, as well as with the southern tribes, were carried on chiefly by them. When first known they occupied that part of western New York between Seneca Lake and the Genesee River, having their council fire at *Nundawao*, near the present Naples. After the destruction of the Erie and Neutral Nation about 1650-60, the remnants of these tribes were chiefly incorporated with the Seneca, who soon spread over the conquered territory westward to Lake Erie and southward along the Allegheny. By these accessions they became the largest and most important tribe of the confederacy. They sided with the English in the Revolution, for which their villages and fields were wasted by Sullivan in 1779, but did not abandon their country, and are still residing mainly within their original territory in New York State. The estimate of 3250 in 1778 remains practically the same to-day, viz. 2710 upon Cattaraugus, Allegheny, and Tonawanda reservations, New York; 345 (mixed with Cayuga, etc.) attached to Quapaw agency, Indian Territory; and an estimated 200 with the other Iroquois on Grand River reservation, Ontario. See IROQUOIS.

SENECA, ANNÆUS. A Roman rhetorician, born at Corduba (Cordova), in Spain. The time of his birth is doubtful, probably not later than B.C. 54. He seems to have been in Rome during the early period of the power of Augustus. He was rich, belonged to the equestrian order, and enjoyed the friendship of many distinguished Romans. The time of his death is uncertain; but he lived perhaps until A.D. 39. His extant works are *Controversiarum Libri X.*, a collection of imaginary law cases for practice in discussion, and *Suasoriarum Liber*, a collection of 'themes,' neither of which is complete. The best editions are those of Kiessling (Leipzig, 1872) and Müller (Prague, 1887).

SENECA, LUCIUS ANNÆUS (c.4 B.C.-A.D. 65). A celebrated Roman Stoic philosopher, the son of Annæus Seneca, born at Corduba about B.C. 4. When a child he was brought by his father to Rome, where he began the study of eloquence. He cared more, however, for philosophy, in which his first teacher was the Pythagorean Sotion, whom he afterwards left to follow Attalus the Stoic. He traveled in Greece and Egypt, and pleaded in courts of law; but, notwithstanding his forensic triumphs, he left the bar from fear of Caligula's jealousy. He filled the office of quæstor, and had already risen high in the favor of the Emperor Claudius, when he was accused of an intrigue with Julia, the daughter of Germanicus, and wife of Vinicius. He was exiled to Corsica, where he remained for eight years, deriving from philosophy what consolation he could, while incessantly appealing to the Emperor for pardon. When Claudius married Agrippina, Seneca was recalled by her influence, raised to the prætorship, and appointed instructor of her son Nero. On the death of his governor and military tutor, Burrus, Nero gave way to his depraved passions with a force which Seneca could not control. All his influence over his pupil was lost, but he profited by his extravagant bounty to such a degree that his accumulated wealth amounted to 300,000 sestertia, or about twelve million dollars of our money. Seneca, to avert dangerous consequences, offered to refund to the Emperor his gifts, and begged leave to retire on a small allowance. This Nero declined; and Seneca, under pretense of illness, shut himself up, and refused to appear in public. Nero then attempted to have him poisoned, but failed. A short time afterwards Antonius Natalis, when on his trial for participation in the conspiracy of Piso, implicated Seneca as one of the conspirators. He was sentenced to put himself to death. His wife, Paulina, declared her resolution to die with him, and, in spite of his remonstrances, accompanied him into the bath in which, according to his own choice, he was to be bled to death. The Emperor, however, would not allow Paulina to die, but removed her from her husband, who gradually expired.

Seneca's extant writings are mainly on moral subjects, and consist of epistles, and of treatises on Anger, Consolation, Providence, Tranquillity of Mind, Philosophical Constancy, Clemency, The Shortness of Life, A Happy Life, Philosophical Retirement, and Benefits. He also wrote seven books entitled *Quæstiones Naturales*. Ten tragedies, ascribed to him by Quintilian, and generally included in editions of his works, have also come down to us. They were not intended, and are certainly not adapted, for the stage. They are overcharged with declamation, and wanting in dramatic life. They are of importance in dramatic history on account of the great influence they exerted on Renaissance and French classical drama. Of his genuine prose writings modern opinion takes a divided view, some critics praising his practical sagacity, others finding him

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wanting in speculative reach. The *Apocolocyntosis Divi Claudi*, usually ascribed to him, is an amusing satire on the deceased Emperor Claudius; the word *apocolocyntosis*, 'pumpkinification,' is coined humorously for *apotheosis*, 'deification.' It is published in Bücheler's *Petronius* (Berlin, 1882), and edited by Ball (New York, 1903). The larger works are edited by Haase (Leipzig, 1893-95), and by Hosius (ib., 1899). The tragedies were edited by Holtze in the Tauchnitz series (ib., 1872).

SENECA FALLS. A village in Seneca County, N. Y., 42 miles west of Syracuse; on the Seneca River and the Seneca and Cayuga Canal, and on the New York Central and Hudson River and the Lehigh Valley railroads (Map: New York, D 3). It has the Mynderese Academy, a public library, and the Johnson Home for Indigent Females. Cayuga Lake Park, three miles distant, is a summer resort of some prominence. Seneca Falls is situated in a rich farming region, and manufactures pumps, hydraulic and foot power machinery, fire engines, hook and ladder trucks, woolen cloth, and advertising novelties. Seneca Falls was settled in 1791, and was incorporated in 1831. Population, in 1890, 6116; in 1900, 6519.

SENECA LAKE. The largest and deepest of the group of elongated lakes in west-central New York (Map: New York, D 3). It is 37 miles long and from 1 to 4 miles wide, and its greatest depth is about 630 feet. Its shores are bold, and the surrounding country is picturesque. It receives the waters of Keuka Lake, and discharges into Lake Ontario through the Seneca and Oswego Rivers. It is navigated by steamers, and connected by canals with the Erie Canal and Chemung River.

SENECIO, sē-nē'shī-ō. A genus of plants of the natural order Compositæ. The species, of which nearly one thousand have been described, are mostly herbs individually restricted in range, but generically of almost world-wide distribution, and especially abundant in temperate climates. Some species are used for fuel; others have been reputed useful for wounds; several species, especially *Senecio cineraria* (dusty miller), *Senecio mikanioides* (Cape ivy), and *Senecio argenteus* (silvery senecio), are widely popular ornamental plants.

SENECÚ, sā'nā-kōō'. A village in Chihuahua, Mexico, on the south bank of the Rio Grande, about 7 miles below El Paso, occupied by a remnant of the Piro Indians (q.v.), a former Pueblo tribe of New Mexico. Although the population is entirely Catholic and Spanish is the ordinary language, the old tribal organization is still kept up, with a cacique, governor, war chief, and other officers. The Senecú retain also some degenerate Pueblo dances, with the Indian drum and rattle, together with the pottery art, the foot races, and rabbit hunts of their Pueblo kindred. One or two old persons yet remember something of the language. Population, in 1903, about 60.

SENEFELDER, zĕn'e-fĕl'dĕr, ALOYS (1771-1834). The inventor of lithography. He was born at Prague, Bohemia, but was early taken to Munich, where he became an actor. He then turned his attention to printing, and invented the process of printing from stone known as lithography (q.v.). After unsuccessful attempts to found establishments in Munich, Offenbach, and Vienna, he returned to Munich and accepted the position of inspector of maps at the royal printing office, continuing his private establishment as well. In 1826 he invented the process of lithographing in colors, and in 1833 perfected it so that he could print the colors on linen, thus imitating oil painting. He wrote a *Lehrbuch der Lithographie* (1818), which was translated into French (1819); and *Behandlung des Ueberdrucks auf der kleinen lithographischen Handpresse* (1824). Consult: Nagler, *Aloys Senefelder und Simon Schmidt als Rivalen* (Munich, 1862); Pfeilschmidt, *Aloys Senefelder* (Dresden, 1877); Scamoni, *Aloys Senefelder und sein Werk* (Saint Petersburg, 1896).

SENEFFE, se-nĕf'. A small village in the Province of Hainault, Belgium, 22 miles southwest of Brussels. The district has extensive manufactures of pottery and glass. Near by is the battlefield on which William of Orange, at the head of the force of the coalition against France, was defeated, after a bloody contest, by Condé, August 11, 1674.

SENEGAL, sĕn'ē-gal' (Fr. *Sénégal*). A river of the French colony of Senegal, on the southwestern border of the Sahara (Map Africa, C 3). Its principal headstream, the Bafing or Black River, rises in the mountains of Futa Jallon, near the sources of the Niger, and flows north till it is joined by the Bakhoi or White River, at Bafulabe. The combined stream then flows generally northwestward and empties into the Atlantic Ocean, at Saint Louis, 110 miles north of Cape Verde. It is the first perennial stream for a distance of 1300 miles south of Morocco, and marks the northern limit of the rain zone. Its length is about 1000 miles. The upper course forms during the wet season a series of rapids as it descends over rocky ledges which in the dry season are converted into dams separating the river into a series of reservoirs. Below the confluence of the headstreams the river descends from the plateau in the Falls of Guine and Felu, each about 50 feet high. In its lower course it flows through a narrow but low and level and very fertile alluvial plain, in which it frequently divides to form large elongated islands which are flooded during high water. Near its mouth the river forms a large delta with numerous branches, which, however, do not enter the ocean directly, but flow into a long, narrow coast lagoon cut off from the sea by a bar of sand. Through the latter there is a shifting opening which is very difficult and dangerous to enter. The Senegal is navigable to the Felu Falls, and there is a regular service in the rainy season to Kays, 460 miles, whence a railroad has been built to Bafulabe and is being extended to Bammaku on the Niger. The Faleme, the principal tributary, is also wide and deep, and navigable over 100 miles. Consult Ancelle, *Les explorations au Sénégal* (Paris, 1887).

SENEGAL. A French colony in West Africa, extending along the coast from Cape Blanco to the northern boundary of Portuguese Guinea, excluding the British colony of Gambia (Map: Africa, C 3). In 1902 the part east of Kays, comprising the protected States along the upper Senegal and the Middle Niger, was detached from Senegal and was constituted a separate division

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of French West Africa under the name of the Senegambia and Niger Territory. Since, however, this region is still for the most part only nominally under the French rule, and as its economic development is so closely connected with Senegal proper, it is deemed advisable to apply the name of Senegal in this article to the entire territory between the Atlantic and the Military Territories of French Sudan. The area of Senegal proper is estimated at 80,000 square miles. There are no reliable figures for the rest of the country.

The region, as far as it is known, is without any prominent elevations. The coast district is mostly flat and sandy and most fertile in the valley of the Senegal. The northern part belongs to the region of the Sahara, while the portion south of the Senegal is densely wooded and better watered. In the interior elevations of nearly 2000 feet are occasionally met with. The western part is drained by the Senegal, whose main headstream is the Bafing, and which receives the Faleme from the south and the Kulu from the north. The Faleme is navigable. The portion south of Gambia is watered by the Salum and the Casamance.

The climate of Senegal is on the whole unhealthful. The year is divided into two seasons. The rainy season begins at the end of May at the mouth of the Casamance, and in the middle of July at Saint-Louis. During the dry season the temperature at Saint-Louis occasionally falls as low as 46°, but during April and May the northeastern wind from the Sahara not infrequently raises it to over 110° in the shade. Yellow fever often comes with the rainy season. The flora of the northern part is on the whole scanty, but abounds in gummiferous acacia. In the valley of the Senegal the vegetation is luxuriant and the region south of the river is especially rich in palms.

In the centre of the colony are vast steppes, suitable for grazing. Earthnuts, which form at present the principal export of Senegal, are grown along the coast, and kola nuts are found along the rivers in the south. The natives also raise millet for local consumption. Senegal is developing very rapidly and promises to be a successful colony. A large increase is shown in the exports. The natives produce some textiles, and metal ware, characterized by more or less skill.

The imports have grown from $5,456,000 in 1895 to $12,366,274 in 1901, and the exports from $2,400,126 to $7,373,635. Over one-fourth of the imports consists of cotton goods. Earthnuts form over one-half of the exports, and gum and rubber over one-tenth. The chief waterway of the colony, the Senegal, is navigable during the rainy season as far as Kays, 460 miles from its mouth. Saint-Louis, the capital, is connected by a railway line (163 miles long) with Dakar, the chief seaport of the colony. Another line from Kays, the head of navigation on the Senegal, to Bammaku on the Niger is in course of construction.

The local budget of the colony for 1903 balanced at over $1,000,000. The Governor-General of French West Africa, of which Senegal is one of the colonies, is assisted by a privy council of officeholders and a general council of 20 elected members. The colony is represented by a Deputy in the French Chamber of Deputies. The internal administration differs in various parts in accordance with the degree of subjugation of tribes. The communes of Saint-Louis, Gorée, Dakar, and Rufisque—on the coast—are organized like the French communes, but elsewhere the rule of the natives, especially in the northern part, is little interfered with. Estimates place the population at over 2,000,000, including the population of the Senegambia and Niger Territory. The inhabitants are composed of two races, the Moors and the negroes. The Moors inhabit principally the northern part of Senegal and are divided into the three tribes of Trarza, Brakna, and Duaish, and have adopted many traits of their negro subjects, with whom they have largely intermixed. They are engaged principally in the gathering of rubber and transportation and are believed to number about 80,000. The most numerous of the negro tribes are the Yolofs, who inhabit the coast region. Their number is put at 400,000. They are characterized by a fine physique and a peaceful disposition, and their religion is a corrupt Mohammedanism. The Serers, an inferior negro race, are found principally in the region of Baol, near the coast. The Bambaras are a mixed race, inhabiting the region of Kaarta, north of the Senegal. The Fulahs are found all over the region. The Toucouleurs are a warlike tribe of mixed origin inhabiting the left bank of the Senegal. They are zealous Mohammedans and number over 200,000. There are also the Diolas and the Balantes, the latter being found principally along the Casamance River. The principal settlements are Saint-Louis (q.v.); the capital, Dakar (q.v.); Bakel, a fortified post on the left bank of the Senegal, about 350 miles southeast of Saint-Louis; Bammaku, a fortified post and commercial centre on the Niger, and the proposed terminus of the railway line from Kays; Kays, with a population of about 9000; Rufisque (8000 inhabitants), a railway station near Dakar; and Medina (8000 inhabitants), a railway station near Kays.

The Senegal was discovered by navigators from Dieppe in the fourteenth century. In 1582 a French company established a factory at the mouth of the Senegal, which became the town of Saint-Louis in 1626. The Dutch settlements along the coasts were acquired by the French through the Treaty of Nimeguen in 1678. In 1758 the French possessions of Senegal were taken by the British and restored in 1783, but seized again in 1800 and 1809 and finally restored to the French in 1817. The Moorish tribes of the north, who showed the greatest resistance to the French rule, were pacified by General Faidherbe in 1860.

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SEN'EGAM'BIA. A region in Western Africa. See SENEGAL.

SENESCENCE (from Lat. *senescere*, to grow old, from *senere*, to be old, from *senex*, old). The state of transition to old age. Old age, rapid decay, and a sudden collapse with death occur in many insects immediately after egg-laying. On the other hand, lobsters and crabs, oysters, and other mollusks lay eggs year

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after year for some twenty years. Certain animals keep growing for a century. (See LONGEVITY.) We see in domestic animals that as old age creeps on they become affected as in man. They lose their acuteness of hearing, become stiff in their limbs, and enter into a senile state.

In many forms of animal life senile characteristics become inherited in middle life. Hyatt has shown that in ammonites and other mollusks the species and type may arise as larval or immature forms, become mature, more or less specialized and ornamented, and then die out in a series of senile forms which recall those of the childhood of the type. See GROWTH.

Consult: Minot, "Senescence and Rejuvenescence," in *Journal of Physiology*, vol. xii. (1891); Hyatt, "Genesis of the Arietidæ," in *Smithsonian Contributions* (Washington, 1889); "Phylogeny of an Acquired Characteristic," in *Proceedings of the American Philosophical Society* (Philadelphia, 1894).

SENESCHAL, sĕn'e-shal (OF. *seneschal, senescal,* Fr. *sénéchal,* from ML. *senescalcus, siniscalcus,* from Goth. *sineigs,* old; connected with Ir., Gael. *sean,* Lith. *senas,* Lat. *senex,* Gk. *ἕνος, henos,* Skt. *sana,* old + *skalks,* servant; connected with OHG. *scalc,* Ger. *Schalk,* AS. *scealc,* obsolete Eng. *shalk,* servant). Originally probably an attendant of the servile class who had the superintendence of the household of the Frankish kings. In the course of time, however, the seneschalship rose to be a position of dignity, held no longer by persons of servile race, but by military commanders, who were also invested with judicial authority. The dignity of grand seneschal of France was the hereditary right of the dukes of Anjou. This office gave the right to command the armies in the absence of the King, control over the affairs of the King's household, and the exercise of supreme judicial authority. Philip Augustus, however, in 1191, suspended the judicial functions. The lieutenants of the chief feudatories of France often took the title of seneschal, and, as in the course of time the great fiefs were absorbed by the Crown, they were as a rule divided for judicial purposes into districts under the authority of royal officers, who retained the old name, while the districts were known as sénéchaussées. A similar office in England and Scotland was designated *steward,* but is rendered into Latin as *senescalcus.*

SÊNG- (or SŬNG-) KO-LIN-SIN, sĕng'kō'-lĕn'sĕn'. A famous Mongol general, a prince of the Kortchin tribe, who distinguished himself in connection with the advance in 1853 of the Taiping rebels, whom he defeated twice in battle. In 1860 he was chosen to oppose the advance of the Anglo-French punitive expedition to Peking, and is noted particularly in connection therewith for the great circular mud rampart with which he surrounded Tien-tsin at a distance of two miles, and still known to foreigners as 'Seng-ko-lin-sin's folly.' (See TIEN-TSIN.) In operating against the Nien-fei rebels in Central China in 1864 his army was overwhelmed by superior numbers and he was killed.

SENGO'RA. A seaport on the eastern coast of the Malay Peninsula, about 475 miles south of Bangkok (Map: Siam, D 6). Its harbor is spacious and well sheltered, and there is a considerable trade in fish, fruit, and tin. The population is estimated at about 10,000. The Chinese founded a settlement here early in the nineteenth century.

SENIGALLIA, sā'nē-gäl'lē-ä, or **SINIGAGLIA,** sē'nē-gä'lyä. A city in the Province of Ancona, Italy, at the mouth of the Misa, 16 miles by rail west-northwest of Ancona (Map: Italy, H 4). It is modern in appearance, having broad streets and well-built houses. It has a seminary, a technical school, and a library. The industries are silk-spinning, sugar-refining, and fishing. The famous annual fairs are still well attended. Senigallia was founded by the Senonian Gauls (whence the ancient name, *Sena Gallica*), and colonized by the Romans in B.C. 285. During the Middle Ages the Guelph and Ghibelline wars left the city in a ruined condition. At Senigallia on December 31, 1502, Cesare Borgia treacherously put to death a number of nobles of the Papal States whom he had enticed there under a pretext of concluding peace. In 1521 the town became a Papal possession. Population (commune), in 1901, 23,156.

SENILITY (from Lat. *senilis,* belonging to old age, from *senex,* old). The period of old age. In man the decline of life and the approach of old age is marked by special physiological conditions and pathological changes. There is no death from old age. In all cases some lesion is found which points the way to the cause of death. (See PATHOLOGY.) That is, some pathological change is always present which interferes with proper functionating. There are probably no cases of old age in which arteriosclerosis (q.v.) is not present. The senile kidney is a source of great danger. The respiratory apparatus of the aged is always enfeebled. Bronchitis is very common, with resulting emphysema (q.v.), and chronic disseminated pneumonia frequently is in evidence at autopsies upon the aged. Fevers easily supervene upon infections from the digestive or urinary tracts. Especially during fevers do the respiratory phenomena of the aged become patent. In the field of cardiac disorder there is always a tendency to asystole, or failure of complete contraction of the walls of the heart—a condition which occurs with considerable frequency at death. The nerve functions are all diminished. Sensibility, both general and special, is decreased, as are also the nerve reactions. The aged person is especially liable to traumatisms, because of lessened muscular tone as well as decided fragility of the bones. Fractures of bones are frequent, and frequently aged broken bones fail to knit. The aged patient, also, bears very badly the immobilization necessary after fracture of the thigh. Atrophy and digestive disorders result very promptly, and the function of the kidneys is much altered by enforced rest. The lungs are easily invaded by hypostatic congestion. Of special diseases, gout and rheumatism are very frequent in the aged. They are also more liable to the infection of erysipelas. Epidemic influenza, or *grippe,* is accompanied by greater prostration, is frequently marked by general adynamia and often by cardiac atony. The pulmonary features of the disease are less evanescent than in the adult, though perhaps less acute. Typhoid fever is frequent in the aged, and begins very insidiously. Their most frequent gastric affection is cancer. Apoplexy is a very common

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cause of death in old age, and cerebral softening is not uncommonly produced by the lesions of chronic endarteritis.

The precautions to be taken against the rapid advance of age include avoidance of alcohol during one's whole life; moderate eating, especially after the age of forty; moderate exercise after the age of sixty is reached, or after senescence has begun to manifest itself; avoidance of strain, physical or mental; avoidance of worry, anger, and grief; proper clothing for all seasons and conditions, and other avoidance of exposure; together with out-of-door air.

Senility is a race character. The lower or backward races mature at the age of eighteen to twenty-two, while the white race does not stop growing until the age of thirty. Some of the races which have rapidly faded away in contact with civilization had probably already entered into a senescent state. Woman outlives man. At the age of eighty, three women are living to one man, although they mature earlier than men. See LONGEVITY.

SE'NIOR, NASSAU WILLIAM (1790-1864). An English economist, born in Berkshire. He was educated at Eton and Magdalen College, Oxford, where he graduated in 1811, taking a distinguished first-class in classics. In 1819 he was called to the bar at Lincoln's Inn. In 1825 he was elected to the Drummond professorship of political economy at Oxford. He held it for the statutory term of five years. In 1832 the enormous evils of the poor-law administration in England led to the appointment of a commission of inquiry. Senior was one of the commissioners, and the portion of the report in which the abuses of the existing system were detailed was drawn up by him. This report encouraged the Whig Government to bring in the Poor-Law Amendment Act of 1834. In 1836 he received the appointment of master in chancery, and in 1847 was reëlected to his former professorship for another term of five years. He served on numerous important commissions in his later years. His "Outline of Political Economy" was originally published in the *Encyclopædia Metropolitana* (1850). In this work and in various essays he developed the economic doctrines laid down by Ricardo and the free-trade school with much felicity of expression, which entitles him to rank as the foremost economist between Ricardo and Mill. Senior was the first writer to demonstrate clearly the subjective ground of interest payment ('abstinence' in Senior's language). His analysis of monopoly is the most important contribution of the classical school to the theory of that subject.

SENKOVSKI, sĕn-kŏf'skê, OSSIP IVANOVITCH (1800-58). A Russian Orientalist and historian, born near Vilna, and educated in that city. He was professor of Oriental languages in the University of Saint Petersburg from 1822 to 1847, founded in 1834 a periodical called *The Reader's Library*, and in it, and in the *Son of the Fatherland*, published several novels under the pseudonym Baron Brambæus. He translated Morier's *Hajji Baba* (2d ed. 1845), and wrote *Collectanea*, a series of selections from Turkish authors on the history of Poland (1824-25), and *Supplément à l'histoire des Huns, des Turcs et des Mongols* (1824).

SENLAC, BATTLE OF. See HASTINGS.

SENLIS, sän'lês'. The capital of an arrondissement in the Department of Oise, France, 33 miles north by east of Paris, on the Nonette River (Map: France, J 2). Its walls, erected in the Gallo-Roman period, are still in good condition, and there are also in the vicinity the ruins of an old Roman amphitheatre. The Gothic Cathedral of Notre Dame dates from the twelfth century. The twelfth-century Church of Saint Frambourg, the sixteenth-century Church of Saint Pierre, and the College of Saint Vincent, with its twelfth-century abbey church, the town hall, and the archæological museum are also noteworthy. A treaty was concluded here in 1493 between Maximilian and Charles VIII. of France, by which the former recovered Artois and Franche-Comté. Population, in 1901, 7115.

SENN, NICHOLAS (1844—). An American surgeon, professor of the practice of surgery and of clinical surgery in Rush Medical College, Chicago, Ill. He was born in Buchs, Switzerland, and came to the United States in 1853, settling in Ashford, Wis. After a high school education and some experience in teaching he began to study medicine, and graduated from the Chicago Medical College in 1868. He also graduated in medicine at Munich in 1878. He served as house physician in the Cook County (Ill.) Hospital, in 1868-69; practiced medicine in Fond-du-Lac, Wis., in 1869-74; in Milwaukee, Wis., in 1874-93; and was professor of the principles and practice of surgery at Chicago College of Physicians and Surgeons in 1884-87, and since 1888 he has been professor of the same branch of surgery in Rush Medical College, and since 1893 has practiced in Chicago. He served as surgeon-general of Wisconsin, and as surgeon-general of the National Guard of Illinois, as attending surgeon to the Presbyterian and Saint Joseph's Hospitals in Chicago. At the outbreak of the Spanish-American War Dr. Senn was appointed chief surgeon of the Sixth Army Corps with the rank of lieutenant-colonel of volunteers, and chief of the operating staff in the field. He served till September, 1898. Dr. Senn is a member of many medical associations in the United States as well as in foreign countries. Among his contributions to literature are: *Varicocele* (1878); *Experimental Surgery* (1889); *Intestinal Surgery* (1889); *Surgical Bacteriology* (1889); *Principles of Surgery* (3d ed. 1901); *Syllabus of Surgery* (1892); *The Pathology and Treatment of Tumors* (1895); *Medico-Surgical Aspects of the Spanish-American War* (1900); *Practical Surgery for the General Practitioner* (1901).

SENNA (OF. *senne, sene,* Fr. *séné,* from Ar. *sana, senna,* from *sanaya,* to make easy to open). The leaflets of Cassia acutifolia from Nubia and Upper Egypt, and of Cassia angustifolia from Southern Arabia; a brisk cathartic. *Cassia acutifolia* is a half-shrubby plant, about two feet high, with racemes of yellow flowers, lanceolate acute leaves, and flat elliptical pods, somewhat swollen by the seeds. It grows in the deserts near Assuan, and the leaves are collected by the Arabs and carried by merchants to Cairo for sale. The active principle of senna is a glucoside, cathartic acid. It acts effectively in about four hours, causing watery movements which contain some bile. It increases both the intestinal secretions and peristalsis, and may cause some griping. Excreted with the milk and other secretions

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it purges the nursing child. Its best known preparation is compound licorice powder. See CASSIA; and Plate of CARNATIONS, ETC.

SENNACHERIB, sĕn-năk'e-rĭb (Bab. *Sin-ahe-erba*, Sin has increased the brothers). King of Assyria, B.C. 705-681. He succeeded his father, Sargon, and at the beginning of his reign had to deal with a revolt of the Babylonians, headed by Merodach-Baladan. The latter attempted to involve Hezekiah, King of Judah, in the revolt (II. Kings xx. 12-19). After defeating the Babylonians Sennacherib first proceeded against the Kassi and Ellipi, and then turned his attention to the west. He captured Sidon and the cities dependent upon it, Ashkelon, Ekron, and neighboring cities, and defeated the Egyptians, who undertook to check his progress. The cities of Judah fell into his hands, one after the other, and Hezekiah was shut up in Jerusalem, but refused to surrender at the demand of the representative of the Assyrian King. At this juncture Sennacherib was obliged to return to Assyria, probably because of the conditions in Babylonia; but Hezekiah seems to have submitted to his general, as he forwarded to Nineveh a heavy tribute. There is some reason to think that there may have been a campaign against Syria and Egypt (II. Kings xix. 9-37) toward the end of Sennacherib's reign when a serious disaster befell the Assyrian army. Later Sennacherib undertook an expedition against Cilicia and Cappadocia. The trouble in Babylonia continued and Sennacherib finally destroyed the city entirely and exiled the inhabitants. In B.C. 681 he was assassinated by two of his sons and was succeeded by another son, Esar-haddon. Consult: Tiele, *Babylonisch-assyrische Geschichte* (Gotha, 1885); Rogers, *History of Babylonia and Assyria* (New York, 1900); the "Annals of Sennacherib," and the "Babylonian Chronicle," in *Keilinschriftliche Bibliothek*, vol. ii. (Berlin, 1890); *Records of the Past*, new series, vol. vi. (London, 1892).

SENNAR, sĕn-năr'. A province of Egyptian Sudan (q.v.), situated between the White and Blue Nile, and extending from Khartum south to Fasokl, and known in a wider sense as Dar Sennar. The Province of Kordofan is on the west. The area of Sennar is unknown. It is essentially a plain with isolated mountains dotting its surface. In the southeast it becomes rougher, forming the approach to the Abyssinian highlands. The soil is alluvial and carries gold. Sennar is in the moist zone. The Khartum section of the country has little in the way of vegetation but grasses. In the South are forests. Among the usual trees found are the acacia and the tamarind. Lions, elephants, hippopotamuses, etc., abound. The bog ores yield a good grade of iron. No figures are given for the population, of which the negro race Funj (q.v.) forms a noteworthy part. This race came hither about the year 1500 from Central Africa, and founded the Sennar kingdom, which ceased to exist in 1821. The old capital, Sennar, on the Blue Nile, has about 10,000 inhabitants. It has suffered in the rise of Khartum. Wod Medina and Mesalamia, both on the Blue Nile, are important towns.

SENS, sănz. An archiepiscopal city and the capital of an arrondissement in the Department of Yonne, France, 70 miles southeast of Paris, on the Yonne River (Map: France, K 3). The most prominent edifice of the city is the cathedral of Saint Etienne. It dates from the twelfth century, but has undergone frequent restorations. It is of the Romanesque and Gothic styles of architecture, the latter being more generally used. The town hall, also a fine structure, has a museum of precious stones, an art gallery, and a library. Manufacturing is the leading industry, the chief products being fertilizers and farm implements. Population, in 1901, 14,962. Sens, the ancient *Agenticum*, at the time of Julius Cæsar was one of the largest cities of Gaul and still has interesting Roman remains. It was made the seat of an archbishop in the eighth century. The see was changed to a bishopric in 1791, was suppressed in 1801, and was finally restored as an archbishopric in 1807. The Council of Sens which condemned Abélard and his teachings was held here in 1141.

SENSATION (OF. *sensacion*, Fr. *sensation*, from Lat. *sensatus*, possessing sense, from *sensus*, sense, feeling, from *sentire*, to perceive; connected with Ir. *sét*, Goth. *sinþs*, AS. *sīþ*, journey, way, OHG. *sinnan*, to journey, Ger. *sinnen*, to perceive, think). A term in psychology connoting two distinct usages, an epistemological and a psychological. The psychological usage may itself be twofold, functional or structural, each usage bringing with it a peculiar set of problems. Logically, sensation is the first step in knowing; chronologically, it is the first manifestation of intellectual function. Obvious as this view appears, it will not bear the test either of a rigid epistemology or of accurate psychological analysis. Knowledge does not proceed from bare sensations to complex perceptions, in its advance from acquaintance-with to knowledge-about. If it is knowledge at all, it is judgment (q.v.); and the difference between simple and complex judgments is not the difference between sensation and perception. Neither are the intellectual functions built up, in the time order, from the juxtaposition or amalgamation of sensations into perceptions; where there is intellectual functioning, there is, from the first, the function of perceiving. Sensation has in reality no place, despite tradition and historical systems, save in a structural psychology.

Psychologically regarded, sensation is an elementary or simple mental process; it neither knows nor gives knowledge, it *is*. It is the product of analysis and abstraction; it never occurs alone, and never has occurred alone. Since, however, there is, according to certain psychologists, a second ultimate structural process, the affection (q.v.), we must define sensation more nearly. This may be done by enumerating its introspective differences from the affection, but is done most simply by aid of a psychophysical reference; a sensation, we may say, is an elementary mental process connected with (or conditioned upon) a bodily process within a special (specially differentiated) bodily organ. While such a definition is not as satisfactory, from the purely psychological standpoint, as a definition which should leave psychophysics out of account, it is a perfectly unobjectionable working formula, and has the special advantage of enabling us to bring our classification of sensations (distinction of senses) into relation with the definition of sensation.

Sensations cannot be classified otherwise than psychophysically. A statement of the introspec-

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tive differences between a blue and a tone, e. g., must necessarily be cumbrous and analogical; whereas the mention of eye and ear is short and adequate. Psychology therefore follows the time-honored custom of referring sensation-systems, modalities or senses to the organs of sense.

Sensation in physiology is the perception by the mind of change wrought in the body. It is by means of sensation that the mind obtains a knowledge of the existence both of the different parts of the body and of the external world. The brain is the true organ of sensation, but besides this there must be perceptive organs for receiving and conducting tissues (nerves) for conveying impressions to the sensorium. Sensations are usually classed as *common* and *special*. Under the former head are included all sensations that cannot be localized in any particular part of the body, such as fatigue, discomfort, faintness, satiety, hunger, and thirst. In this class are also included irritations of the mucous membranes, of the respiratory tract that excite cough; the desire to defecate or urinate, and, in females, the sensations that precede parturition; and itching, tingling, burning, and aching. The muscular sense, by which muscular efforts are perceived and regulated, must also be considered as a common sensation. *Special sensations* are five in number: touch, taste, smell, hearing, and sight. An important distinction between common and special sensations is that by the former certain changes in various portions of the body are perceived, while from the latter knowledge of the external world is gained in addition. It is to be remembered that the seat of sensation lies in the brain and not in the special organs, although it is commonly said that we hear with the ear, see with the eye, etc., whereas in reality these organs merely receive impressions.

Objective sensations are those excited by some object in the outside world; *subjective sensations* originate within the brain itself. Through habit the mind is accustomed to connect all sensations with external causes, and this difficulty of separating objective and subjective sensations often gives rise to illusions. These may be aural, optical, or tactile, and are strikingly exemplified in the various forms of delirium.

Certain disorders of sensation affect the nerves both of common and special sensation. These may be roughly classified as hyperæsthesia, anæsthesia, and paræsthesia. Hyperæsthesia is an increased sensibility to painful impressions. It is seen in its most severe form in gunshot wounds of the nerves, and is a constant accompaniment of neuritis. Anæsthesia is a loss of sensibility complete or partial, and is produced by contact with various drugs (see ANÆSTHETICS), exposure to cold, and certain disorders of the nervous system. Paræsthesia is a manifestation of disturbed sensation characterized by a number of subjective sensations such as numbness, prickling, tingling, and burning. It may affect any part of the body surface, and occurs in a wide variety of nervous diseases. See NERVOUS SYSTEM AND BRAIN.

Consult: James, *Principles of Psychology* (New York, 1890); Wundt, *Physiologische Psychologie* (Leipzig, 1893); Ladd, *Psychology, Descriptive and Explanatory* (New York, 1894); Kuelpe, *Outlines of Psychology*, trans. (London, 1895); Titchener, *Outline of Psychology* (New York, 1899); id., *Experimental Psychology* (ib., 1901).

SENSATIONALISM (sometimes called SENSUALISM). A term used to designate the theory that the total content of consciousness is of sense origin; that all the higher activities of mind, such as judgment and reasoning, are the results left by the impressions originally made upon the *tabula rasa* of the mind by external objects. These impressions, at first unconnected, are supposed to have entered into mutual relation by virtue of the laws of association (see ASSOCIATION OF IDEAS). Among sensationalists are to be mentioned the Sophists (q.v.) of antiquity, and Hume (q.v.) and Condillac (q.v.) and their followers in modern times. Locke is a sensationalist with large infusion of rationalism (q.v.) in his doctrines. The classic expression of the principle of sensationalism is given in the Latin sentence, *Nihil est in intellectu, quod non fuerit in sensu*. See KNOWLEDGE, THEORY OF.

SENSE AND SENSIBILITY. A novel by Jane Austen (1811). Two sisters, Elinor and Marianne Dashwood, illustrate these two qualities, the course of the story showing the effects of suffering on the impulsive, uncontrolled nature of one and on the sedate, unselfish disposition of the other. The too evident purpose hampers the story, which contains some excellent characterizations, as Mrs. Dashwood, her selfish son, the commonplace Middletons, and vulgar but kind Mrs. Jennings.

SENSE ORGANS. See NERVOUS SYSTEM, EVOLUTION OF THE.

SENSES, SENSIBILITY. See SENSATION.

SENSITIVE BRIER. See SENSITIVE PLANT.

SENSITIVE PLANT. A common name of certain species of Mimosa, so called on account of the irritability (q.v.) of their leaves. Those species which are most irritable are herbaceous or half-shrubby plants with beautifully divided pinnate leaves. The leaflets close upward in pairs when touched, and on repeated or rough touching the leaflets of the neighboring pinnæ also close together, become depressed, and lastly the whole leaf hangs as if withered. If the stem is shaken, all the leaves exhibit the same phenomena. After a short time the leafstalk rises, and the leaflets expand again. On account of this curious and interesting property, some of the sensitive plants are frequently cultivated in hothouses. The same faculty is possessed by the sensitive brier (Schrankia), two or three species of which are indigenous to the Southern United States, and also by the stamens and styles of many plants, especially of certain cacti. By extension, all plants which respond to contact stimuli are said to be sensitive, and in the widest sense all plants may be included. Some plants exceed in sensitiveness the sense organs of the human body.

SENSITIVITY (from *sensitive*, from OF., Fr. *sensitif*, from Lat. *sentire*, to perceive). A term used in psychophysics, meaning 'the bare capacity of receiving and communicating sensations.' It is subdivided into *modal* sensitivity (having reference to a whole sense department) and *sensibility* (having reference to individual sensations). Modal sensitivity is measured by the number of sensations possible to a given sense, e.g. the ear's modal sensitivity is given by 11,000, the number of distinguishable tone quali-

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ties. (See AUDITION.) Since sensations may be investigated with regard to their different aspects or attributes (quality, intensity, extent, and duration), we can further speak of a *qualitative, intensive, extensive,* and *temporal* sensibility. (See LIMEN.) Consult: Fechner, *Elemente der Psychophysik* (Leipzig, 1880); Kuelpe, *Outlines of Psychology,* translated (London, 1895).

SENSORIUM (Lat., sense or organ of sensation). The collective organ of sensation or perception. The cortex or gray matter of the brain, with the important ganglia at its base, is usually meant by this term in modern psychology.

It was long attempted to determine some one point in the brain where the soul is especially located or centralized, and to this point the name of sensorium was applied in the older psychological speculations. The fancy of Descartes made it a small body near the base of the brain, called the pineal gland. The recent views of the nervous system repudiate the idea of a central point of this nature; in consciousness the brain generally is active, although under different impressions and ideas the currents may be presumed to follow different nerve tracks. Consequently no meaning is now attached to a sensorium in psychology, as distinct from the cerebrum at large. See NERVOUS SYSTEM AND BRAIN.

SENTENCE (Lat. *sententia,* opinion, from *sentire,* to perceive). In grammar, an expression of articulate speech, either oral or written, which is, in the judgment both of the speaker and hearer, an organic whole. The sentence is divided into two parts, the subject and the predicate. The subject is that of which something is predicated; the predicate is that which is stated or asked concerning the subject. It is, however, possible to have a sentence in which the predicate, or, more rarely, the subject is suppressed, if it may be readily supplied by the hearer, or is present in the mind of the speaker. This usage is characteristic of the interrogative, imperative, and exclamatory types, and some scholars deny that such sentences which contain no expressed subject or predicate are real sentences. On this view the most primitive form of sentence is probably the assertive or predicative, as *He comes.* From this type was developed the dubitative or potential sentence, *Perhaps he comes,* and the interrogative type, *Does he come?* Here may be seen the subjectless sentence in such an expression as *Come?* with the answer, *Not he,* or (*Is*) *he* (*coming*)? with the answer, *No, she.* The question of the origin of the imperative type of sentence, as *Stop! John!* is a difficult one. It seems on the whole most probable that this was the most primitive of all forms of the sentence, for it must be borne in mind that the imperative mood and the vocative case were originally mere interjections, the most primitive of all forms of speech. (See INTERJECTIONS; LANGUAGE.) Evidence seems to show that there is in the so-called single-membered sentence, even in its earliest form and occurrence, an ellipsis of one of the two members. The cry of an animal is in a sense a predicate to which the subject is supplied by the hearer.

The relation of the subject matter of a sentence to its verbal form is studied most explicitly in logic, where propositions are classified according to the nature or degree of their predications. The proposition, in best usage, is the verbal expression of the judgment which is a mental act. The main differentiations of propositions in traditional logic are into affirmative and negative—*He comes, He does not come;*—and into categorical, hypothetical, and disjunctive—*He comes, If he comes we shall see him, He may or he may not come.* The logical elements of a predication, the subject, copula, and predicate, correspond very closely to the grammatical elements of the sentence, and seem to furnish a basis in the nature of reasoning for the analysis of grammatical forms. In certain modern logical developments, however, theories of judgment consider all propositions as predicates whose subject is reality or the orderly system of human knowledge. According to this view, there is a tacit predication in every complete expression, in the interjection as well as in the categorical affirmation. Propositions, or rather judgments, are then graded upon a psychological scale of belief and certainty—the interjection represents the inevitable and unquestioned; the categorical affirmative (or negative) represents a conclusion of certainty after doubt; the hypothetical proposition represents a generalized case, which is certain, provided the hypothetical element be granted or occur; and the disjunction is a predication of uncertainty within the limits covered by the subject matter of the proposition. All grammatical forms of the sentence are thus more or less elaborate analyses of complex mental states in which each verbal unit represents an abstract of some quality, or predicate of the subject matter of thought. The simplest states are reflected in the single-membered sentence, while the more advanced and involved states necessitate various types of verbal complication.

Sentences are furthermore classed as simple, compound, and complex. The simple sentence consists of a single subject and a single predicate, as, *He comes.* The compound sentence is composed of two or more subjects and predicates, either of which sets forms in itself a simple sentence, and whose parts are normally connected by a conjunction (q.v.), as *He comes here and he goes home.* The complex sentence is either a simple or compound independent sentence, part of which is modified by a dependent sentence, normally introduced by a pronoun (q.v.), but not forming by itself a simple independent sentence, as *He who wishes comes, and he who is eager that more may come goes that he may call them.* The compound or paratactic type of sentence is almost certainly more primitive than the complex or hypotactic sentence. Consult: Delbrück, *Vergleichende Syntax der indogermanischen Sprachen,* vol iii. (Strassburg, 1900); id., *Grundfragen der Sprachforschung* (ib., 1901); Wundt, *Völkerpsychologie,* i., "Die Sprache," (Leipzig, 1900); id., *Sprachgeschichte und Sprachpsychologie* (ib., 1901; Gabelentz, *Sprachwissenschaft* (2d ed., ib., 1901); Paul, *Prinzipien der Sprachgeschichte* (3d ed., Halle, 1898); Jacobi, *Compositum und Nebensatz* (Bonn, 1897); Hermann, *Gab es im Indogermanischen Nebensätze?* (Gütersloh, 1894); Miklosich, *Subjektlose Sätze* (Vienna, 1883); Sigwart, *Impersonalien* (Freiburg, 1888); Kimball, *Structure of the English Sentence* (New York, 1900). For the legal aspect, consult Bosanquet, *Logic* (London, 1888).

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SENTENCE (in law). In its broadest legal sense, a judgment or decree of a court or judge; specifically and technically, a decision in a criminal case, which is called *final* when it determines the entire case, and *interlocutory* when it determines only some point incidental to the progress of the case.

When a sentence is finally rendered according to law the power of the court to punish the prisoner is at an end, but the sentence in many cases may be in the alternative, as where the prisoner is sentenced to pay a fine or in default of that to be imprisoned for a certain period. When the sentence by its terms imposes a greater penalty than the law allows, that part of it which is within the law will stand as a valid sentence; and, if it be void for such excess or for other formal defect, the court may resentence the criminal because the previous judgment was not a valid one, and therefore in law did not constitute a sentence. In this respect the sentence is notably distinct from the verdict, a defect in which cannot be remedied by again subjecting the prisoner to trial. See JEOPARDY.

When the sentence is for imprisonment for two or more successive terms, or to the payment of a fine and to imprisonment for conviction of more than one crime, as where the indictment contains counts, or specifications, charging the commission of separate though connected crimes, and the sentence is made up by adding together the legal penalties for the several crimes committed, it is called an *accumulative*, or, more commonly, *cumulative* sentence. Where the same offense involves a double penalty, as both fine and imprisonment, and both are imposed, the sentence is not therefore cumulative.

The *indeterminate* sentence has arisen from the endeavor to shape the law so as to furnish an incentive to convicted criminals to reform. It has been defined as a sentence which is "imposed by the court without fixing a definite period of limitation or term of imprisonment, but which simply directs that the convict be imprisoned or placed in the custody of the prison authorities to be held for not less than the minimum nor longer than the maximum fixed by law for the offense for which the prisoner stands convicted." Provisions have been made by statute in many of the States for the imposition of such sentences, and they have been found to work well in practice, although the merits of the indeterminate sentence are not fully conceded by all. Such sentences, as above defined, have been upheld as constitutional in some States, as Ohio, Illinois, Indiana, and Massachusetts, but were held unconstitutional in the State of Michigan.

See for further information, such titles as JURY; PUNISHMENT; and consult the report of J. Franklin Fort to the American Bar Association (1898).

SENTIMENT (ML. *sentimentum*, from Lat. *sentire*, to perceive). In psychology, a term sometimes given as a sub-heading under emotion (q.v.) and sometimes set off as a distinctive mental complex. There is a substantial agreement among psychologists that sentiment is closely related to emotion, that it is, however, less abrupt, and contains, at least usually, a larger intellectual element.

The chief classes or groups of sentiment are logical, social, moral, religious, and æsthetic. (1) Logical sentiments are the feelings which come from intellectual processes *as such*: judgment, thought, reasoning, argument. (2) The social sentiments are those that are aroused directly by the interaction of individuals in a community. They include pride, innocence, vanity, trust, security, forgiveness, compassion, etc. (3) The moral or ethical sentiments attach themselves to the ideas of right and duty, of moral approbation and disapprobation, and of conscience. They are closely allied to some of the social sentiments. (4) The religious sentiments combine in various ways sentiments from all the other classes. They include awe, humility, reverence, faith, sinfulness, exaltation, and repentance. (5) The æsthetic sentiments centre about judgments of beauty and ugliness. Consult the authorities mentioned under EMOTION.

SENTIMENTAL JOURNEY, A. A series of sketches by Sterne (1768). The work is based upon some of Sterne's experiences in Southern France, where he spent a year, owing to failing health. Sentimentalism is the theme of the sketches, which are also characterized by their admirable depiction of every-day life.

SENTINEL (OF., Fr. *sentinelle*, sentinel, watch, little path, diminutive of OF. *sente*, path), SENTRY. A soldier posted in some responsible position to guard or protect the place, persons, or property. The duty of a sentinel is one of the most important responsibilities of military life. In time of peace, the faithful carrying out of sentinel duty is an effective aid to the maintenance of good order and military discipline; while, in active service, the safety and security of the camp or post, and frequently the lives of comrades, will depend on his vigilance. In the United States Army, post and camp guards are relieved every twenty-four hours, and, except in emergencies, privates are not detailed for guard duty more than once in five days. During their tour of duty, each sentinel is subject to the orders of the commanding officer, the officer of the day, and the officers and non-commissioned officers of the guard only, and all persons, of whatever rank, are required to observe respect toward him. He must not permit more than one of any party to approach him for the purpose of giving the countersign. The punishment for any dereliction of sentry duty is very severe, and in actual war may involve the death penalty. See GUARD.

SENUSSI, *se-nōō'sē*, MOHAMMED IBN ALI ES-SENUSSI. A North-African Moslem, who, under the influence of Wahabism (See WAHABIS), founded at Mecca in 1837 a brotherhood for the purification and propagation of Islam. The founder died in 1859, and his son established a Church-State at Jerabub, in the Sahara, between Egypt and Tripoli. He gave himself out as the Mahdi (q.v.), and undertook by the collection of arms to prepare for a *jihād* or holy war. The Brotherhood of es-Senussi is a puritanic order of the dervish type, secret in its organization. It has some 120 centres in North Africa and Arabia, including a strong one at Mecca, where many pilgrims from all parts of the world are initiated. The Senussi movement has resulted in the rapid spread of Mohammedanism among the Sudanese tribes, and has not failed to take on a political aspect. Consult: Dupont and Cappolani, *Les confréries religieuses musulmanes* (Algiers, 1887).

SEOUL, *sē-ool'*, or SÖUL, more properly HANYANG. The capital of Korea, about 3 miles from

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the north bank of the river Han, and about 19 miles in a direct line east-northeast of Chemulpo, its port on the Yellow Sea (Map: Korea, G 4). It lies in a basin surrounded by rugged hills, and several lofty rocky crags rise within the city. The city proper is enclosed by a high wall, having a circuit of about 10 miles and pierced by eight gate-ways. It is divided into four sections by two broad avenues, intersecting at right angles. The remaining streets are mostly narrow and crooked lanes. The houses are as a rule low mean dwellings, a large proportion of them mere hovels. The principal edifices are the old and the new royal palaces, the former of which is an extensive group of well built granite structures surrounded by beautiful parks. Other notable buildings are a temple of Confucius, the temple of royal ancestors, and a Roman Catholic cathedral. Seoul has an electric light plant, and an electric street-railway runs to the river port, Riong-san. The Han has not sufficient depth to give access to large vessels, but a railway connects the city with Chemulpo. Other railway lines are under construction to Fusan and Wiju. There is telegraphic communication with the principal cities of the country and with the outside world. Seoul is the social and educational centre of Korea. Two daily newspapers are published. There are several schools for the teaching of foreign languages. Seoul was made the capital of the kingdom in 1392, and was opened to foreigners in 1883. Population, in 1902, 193,606.

SEPARATE ESTATE (Lat. *separatus*, p.p. of *separare*, to separate, from *se-*, apart + *parare*, to prepare). A legal term commonly employed to denote that property of a married woman held by her independently of her husband's interference and control. In England and in most of the United States the common-law rule (see HUSBAND AND WIFE) have been modified, and in some respects entirely abrogated, by statutes. The tendency is to give a married woman the complete control of all her property as if she were single. In probably all of the United States, by statutes, the real property of a married woman is now free from all claims of her husband, except his inchoate right to curtesy, and in most States the same rule applies to personal property. In most of the United States the savings of a wife out of money given to her by her husband for household expenses do not become her separate property, but are the property of her husband. Where, however, property is conveyed to a married woman by an instrument containing conditions and limitations as to the possession and disposition, the latter will govern, as the statutes are intended to cover only cases where there is no express limitation of ownership, or where property is owned before marriage or acquired by descent. See DOWER; CURTESY; MARRIAGE.

SEPARATION (Lat. *separatio*, from *separare*, to separate). A technical legal term, employed to denote a cessation of cohabitation of husband and wife by mutual agreement, and without the intervention of a court of law. This is commonly done where husband and wife believe themselves unable to agree from incompatibility of temper, but where there is no cause for an absolute divorce, and often no cause for a judicial separation. The parties usually sign a separation agreement, which generally contains provisions for the wife's maintenance by the husband, the disposition and custody of the children, and so on. The law does not favor the separation of husband and wife, and, therefore, if the agreement is deliberately drawn up with an intention to live apart at a future time, it will be null and void. However, if the parties are living apart, and desire to take this means to avoid disputes as to the amount to be paid for the wife's maintenance and as to the custody of children, the agreement will be enforced by the courts. Such an agreement does not prevent the parties, at any time, from resuming cohabitation, upon which it becomes void. While a husband and wife are living apart under a separation agreement, the wife cannot bind the husband for her necessaries, if he pays the amount stipulated in the agreement; but if that amount be grossly inadequate the courts may compel him to support her to the best of his ability. As the marriage is not dissolved by such separation, adultery on the part of either is ground for divorce; and, by the weight of authority, the husband may have an action for criminal conversation with the wife, although the damages may be nominal. The statutes of several States prescribe the details to be observed in executing articles of separation. See ALIMONY and DIVORCE.

SEPARATISTS (Ger. *Separatisten*). A religious social organization which originated in Württemberg, Germany, about the beginning of the nineteenth century. Its members, seeking a deeper religious life than prevailed in the Church, and freedom from military service, to which they were conscientiously opposed, and refusing to send their children to the clerical schools, where principles contrary to theirs were taught, were severely dealt with. Aided by members of the Society of Friends in England and led by Joseph Bäumeler (q.v.), they came to America in 1817, and were received by Friends in Philadelphia. In the same year they bought a tract of land in Tuscarawas County, Ohio, and founded their settlement of Zoar. In their Code of Principles they avow belief in the ordinary doctrines of evangelical Christianity; all ceremonies are banished and declared useless and injurious; honors due to God, such as uncovering the head or bending the knee, are refused to mortals; separation is declared from all ecclesiastical connections and constitutions; the necessity of the political government is recognized; and fidelity to the constituted authorities is professed. Although a rule of marriage was laid down, complete sexual abstinence was held to be more commendable; and marriage was not practiced till about 1830, after which time it became common. Articles establishing a community of goods and interests were adopted in 1819. An act of incorporation for 'the Separatist Society of Zoar' was obtained from the Legislature of Ohio in 1832. Joseph Bäumeler was chosen the principal executive officer, or 'general agent,' and continued its spiritual as well as temporal leader till his death in 1853. The members of the society were of two classes, novices and full members. The novices or probationers served for one year before being admitted to membership of the second class. Their obligations were renewed on entering into full membership, and in addition the candidate made a full and final surrender of all his possessions, and of all that he might acquire. Religious services were held on Sun-

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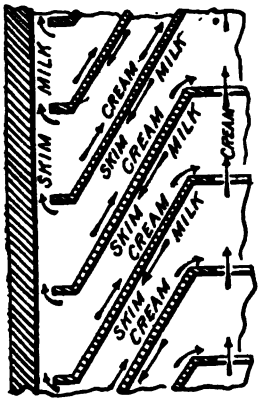
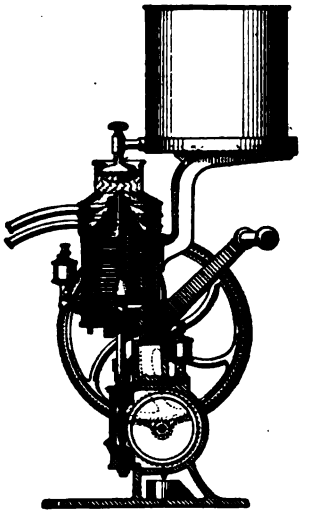
days, with singing, reading of the Bible, and at the principal meeting a discourse by Bäumeler, or, after his death, the reading of one of his printed discourses, but no audible prayer. Baptism and the Lord's Supper were not recognized. Marriage was not permitted outside of the society. Disputes were settled by arbitration. (See ZOAR COMMUNITY.) Consult Nordhoff *Communistic Societies* (New York, 1874); Randall, *History of the Zoar Society* (Columbus, 1900), with a full account of the dissolution of the society; Hinds, *American Communities* (Chicago, 1902); Bäumeler, *Die wahre Separation*, etc. (Zoar, 1856).

SEPARATOR (Lat. *separator*, one who separates, from *separare*, to separate). An apparatus used in dairying to remove the cream from the milk by centrifugal force generated in a rapidly revolving bowl. It supplants the gravity process commonly used. The earliest form of separator consisted of buckets suspended from arms attached to a vertical shaft. When the shaft revolved rapidly the buckets swung out in a nearly horizontal position and the milk in them was separated into layers of cream and skim milk. The modern form consists of a bowl or drum capable of being revolved at a high rate of speed, and with arrangements for admitting the milk and removing the cream and skim milk. The process of separation is continuous, a steady stream of milk running into the bowl, and skim milk and cream pouring out through the respective tubes. The rapidity of separation and the richness of the cream are under the control of the operator.



SECTION OF INTERIOR OF REVOLVING DRUM.


SECTIONAL VIEW OF DE LAVAL HAND-POWER CREAM SEPARATOR.

Separators vary in size and in detail of construction. The small separators run by hand separate from 175 to 350 pounds of milk an hour, and the larger power machines up to 3000 pounds. When properly run the better makes of both hand and power separators leave only about 0.1 per cent. of fat or less in the skim milk. The perfection of the separator has been one of the greatest factors in the development and improvement of dairying (q.v.).

SEPHAR/DIM. See ASHKENAZIM; JEWS.

SEPHAR/VAIM (Heb. *Sĕpharvĕim*). According to II. Kings xix. 13, Isaiah xxxvi. 19, xxxvii. 13, a city in Syria captured by the Assyrians. It has been identified with Sibraim of Ezek. xlvii. 16, lying between Damascus and Hamath. It seems to be mentioned also in the Babylonian Chronicle, i. 28. The same name occurs also in II. Kings xvii. 24, xviii. 34, as one of the places from which colonies were brought into Samaria. Here views differ. Some scholars identify this locality with the one first mentioned; others hold that the reading here should be Sippar, the famous North Babylonian city, the present form arising from confusion of the whole text with xix. 13. According to II. Kings xvii. 31, the Sepharvites introduced the worship of Adrammelech and Anammelech, obscure deities, whose names point, however, rather to the Syrian than to the Babylonian city.

SEPIA (Lat., from Gk. σηπία, cuttlefish, sepia). A brown pigment now little used, but formerly much valued as a water-color. It is prepared from the secretion in the 'ink-bag' of cuttle-fishes. This substance is agitated in water to wash it, and then allowed slowly to subside, after which the water is poured off, and the sediment, when dry enough, is formed into cakes or sticks. In this state it is called 'India ink.' If, however, it is dissolved in a solution of caustic potash, it becames brown, and is then boiled and filtered, after which the alkali is neutralized with an acid, and the brown pigment is precipitated and dried: this constitutes the proper sepia. It is usually prepared in Italy, great numbers of the species which yields it most abundantly (*Sepia officinalis*) being found in the Mediterranean. India ink is prepared in China, Japan, and India, where it is used both as an ink and as a pigment.

SEPOY (Hind., Pers. *sipāhī*, soldier, horseman, from Pers. *sipāh*, *supāh*, army). A native British Indian soldier. They have been a part of the British forces, irregular and regular, since the middle of the eighteenth century, and with the exception of the rebellion, have ever been loyal to Great Britain. (For Sepoy Rebellion, see INDIA.) They consist of practically every race and tribe in India, and are officered by both natives and Europeans. The higher grades are all held by Europeans. See ARMIES, paragraph devoted to *India* under *British Empire*.

SEPP, zĕp, JOHANN NEPOMUK (1816—). A German Catholic Church historian, born at Tölz, Bavaria. After studying philosophy and theology in Munich and visiting the East (1845-46), he became professor of history at the University of Munich, was deposed in 1847, reinstated in 1850, and, for personal reasons, retired in 1867. He was elected to the Frankfort

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Parliament in 1848, to the German Customs Parliament in 1868, and to the Bavarian Chamber in 1849 and 1869. He was an enthusiastic advocate of a united Germany. His principal writings include: *Das Leben Jesu Christi* (2d ed., 1853-62); *Thaten und Lehren Jesu in ihrer weltgeschichtlichen Beglaubigung* (1864); *Geschichte der Apostel vom Tode Jesu bis zur Zerstörung Jerusalems* (2d ed. 1866); *Das Heidentum und dessen Bedeutung für das Christentum* (1853); *Jerusalem und das Heilige Land* (2d ed. 1878); a biography of *Görres* (1896); and numerous contributions to the local history of Bavaria.

SEPPHORIS (Heb. *Sippōri* or *Sippōrīn*). A city of Galilee, famous in later Jewish history, the modern Saffuriye. It lies on the slope of a high hill three miles west of Cana of Galilee, in the midst of a region once famed for fertility. The place is not named in the Old Testament, but is identified by the Talmud with Kitron (Judges i., 30). It is first mentioned by Jōsephus for the date B.C. 104. He speaks of it as "the greatest city in Galilee and built in a very strong place." Gabinius made it the capital of Galilee (about B.C. 57). Originally a strong Jewish centre, Varus expelled the Jewish element (B.C. 4), and it became for a time predominantly Gentile. Herod Antipas handsomely rebuilt it, and it alternated with his other creation of Tiberias as the Galilean capital. In the Jewish revolt it was plundered by Josephus. Under Antoninus Pius it was called Diocæsarea and had the right of coinage. It is famous in the history of the Talmud as the residence for 17 years of Rabbi Judah ha-Nasi, the compiler of the Mishna (died A.D. 217), who made it the great school of Galilee until the rise of that of Tiberias. It thus became again a centre of Jewish life, and was the scene of a Jewish insurrection in 339, which caused its destruction by the Romans. It was early regarded as the scene of the annunciation to the Virgin Mary and the home of her parents. Considerable remains of a large Crusader church exist. Consult the *Survey of Western Palestine*, vol. i. (London, 1881), and Baedeker's *Palestine and Syria;* for the Greek references, consult Schürer, *History of the Jewish People in the Time of Jesus Christ* (Eng. trans., Edinburgh, 1890); for Talmudic references, Neubauer, *Géographie du Talmud* (Paris, 1868).

SEPTARIA (Neo-Lat. nom. pl., from Lat. *septum*, *sæptum*, inclosure, hedge, fence, from *sepire*, *sæpire*, to hedge in, from *sepes*, *sæpes*, hedge, fence). Ovate nodules of argillaceous limestone or clay ironstone, usually divided into angular fragments by reticulating fissures that have been filled with calcite or barytes. The fissures are due to cracking of the nodule while drying. Some organic substance, such as a plant or shell, is frequently found in the interior of septaria and evidently formed the nucleus about which the mineral materials were deposited from solution.

SEPTEMBER. See CALENDAR.

SEPTEMBRISTS (Fr. *Septembriseurs*). The name given to the perpetrators of the 'September massacres' in the prisons of Paris from September 2 to 7, 1792. See FRENCH REVOLUTION.

SEPTENNIAL ACT (from Lat. *septennium*, space of seven years, from *septennis*, of seven years, from *septem*, seven + *annus*, year). An act of the English Parliament passed in 1716 fixing the Parliamentary term at seven years. Since 1694 the term had been three years, but on account of the inconvenience of general elections at such short intervals and the desire of the Whigs to secure steadiness and fixity of political action by maintaining themselves in power the longer term was substituted. Moreover, the fear on account of the Jacobite revolt rendered it unsafe for the Whig Ministry to run the risk of a general election. The right of a Parliament to perpetuate its own existence beyond the legal term was the subject of general opposition and was violently contested. The Septennial law is still in force, although by usage the length of a Parliament seldom exceeds six years.

SEPTET (from Lat. *septem*, seven). In music, a composition for seven voices or instruments. Instrumental septets are almost invariably cyclical works in sonata form. Beethoven's famous septet (op. 20) is written for violin, viola, horn, clarinet, bassoon, 'cello, and double bass; but there is no general specification as to what instruments shall be used in the septet.

SEPTICÆMIA (Neo-Lat., from Gk. σηπτικός, *sēptikos*, putrefying + αἷμα, *haima*, blood), SEPSIS, or SEPTIC INFECTION. A diseased condition of the body due to absorption of bacteria and their circulation in the blood. It is commonly termed blood-poisoning, and was thought to be due to entrance of decomposed tissue into the blood. It is now definitely known to be produced by the bacteria streptococcus and staphylococcus. It is to be differentiated from toxæmia on the one hand and pyæmia (q.v.) on the other. Toxæmia is properly used to designate a systemic condition in which the poisons or toxins alone of pathogenic bacteria present in the body are absorbed and diffused throughout the body by means of the blood and lymph. In septicæmia not only the poison, but also some of the bacteria themselves are distributed through the body through the same channels. In pyæmia not only are both toxins and bacteria present in the blood, but the latter find lodgment in different parts of the body, there to set up new foci of infection. The micro-organisms responsible for septicæmia are the same as those concerned in the production of pyæmia. The bacteria may usually be found in the blood. The changes in the internal organs may be slight or there may be the usual evidences of infection in albuminoid degeneration of the liver, kidneys, and other organs. The lymph glands are usually swollen and the spleen congested and enlarged. The mucous membrane of the stomach and intestines commonly shows an acute catarrhal condition. The blood is apt to be thin, somewhat tarry in color, and its coagulability is lessened. When septic infection results from an external wound, the wound itself may appear healthy, or may show evidences of more or less infection. In such an infection as medical students incur by cutting themselves while dissecting, the wound usually shows marked evidence of the condition, while red streaks running up the arm along the course of the veins and lymphatics show the course which the infection has followed. In very severe cases œdema of the tissue surrounding the wound may develop.

Septicæmia is a surgical disease. It was fre-

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quent in surgical wards of hospitals before the advent of listerism and subsequent precautionary aseptic measures. It always follows infection of an open wound.

Puerperal septicæmia, or 'child-bed fever,' owes its origin to infection with streptococcus through the bleeding surfaces of the newly emptied uterus. The symptoms of septicæmia are a chill or a succession of chills, followed by a continued high fever, with delirium, prostration, and rapid emaciation. Abscesses may form in the internal organs or in lymphatic glands. In the treatment of the condition tonics and tissue-builders and local disinfectants are necessary. The antistreptococcal serum has proved efficacious in many cases. (See SERUM THERAPY.) Sepsis may occur during pneumonia, tuberculosis, Malta fever, and many other diseases, in which ulceration or an open wound offers entrance to bacteria.

SEPTIMIUS SEVERUS, ARCH OF. A well-preserved triumphal arch on the Roman Forum, at the end of the Sacred Way, erected in A.D. 203 by the senate to commemorate the conquest of the Parthians and Arabians, and dedicated to the Emperor Septimius Severus and his sons Caracalla and Geta. The arch is 75 feet high and 82 feet broad, with three passageways connected by a cross passage. On each face of the arch are four composite columns on pedestals bearing groups of prisoners taken in battle. Above the outer arches are panels representing in low relief the eastern campaigns of Severus. The name of Geta was removed from the inscription on the arch after his murder in 212, and the space filled by a laudatory addition to the name of Severus and Caracalla. The arch during a part of the Middle Ages served as a stronghold, and in the seventeenth century the side passages were rented as shops. The surrounding rubbish was partially removed in 1803 by Pius VII.

SEPTIMOLE. In music, the same as septuplet (q.v.).

SEPTUAGINT (from Lat. *septuaginta*, seventy). The common designation of the most ancient Greek version of the Old Testament. The tradition that it was made by seventy-two translators in seventy-two days at the order of Ptolemy II. Philadelphus (B.C. 285-247) is worthless. An examination of the work shows that it is by different hands, and that different portions date from different times. It was doubtless made for the use of Alexandrian Jews who had gradually lost familiarity with the Hebrew language. The law was probably translated first, and the tradition which ascribes this portion to the time of Ptolemy Philadelphus is thought by some scholars to be correct. The concluding portion may be as late as the last century before the Christian Era. The language is the Hellenistic Greek, and the apocryphal as well as the canonical books are included. The LXX. was held in the very highest repute by the Alexandrian Jews and gradually it found its way into Palestine. It is the version of the Old Testament cited by Philo, Josephus, and the New Testament writers. It was read and interpreted in the synagogues of Egypt for some centuries after the Christian Era, was highly esteemed by the early Church, and many of the versions for use in different Christian communities were made from it. It is still in use in the Greek Church. Its greatest value at present is for the textual criticism of the Old Testament. For manuscript and editions, and further details, see BIBLE, heading *Versions*.

SEPTUPLET (from Lat. *septuplum*, septuple, from *septem*, seven + *-plus*, -fold). A group of seven equal notes, which are to be performed in the time usually given to four notes of the same kind (in common time), or to six notes (in six-eighth time). It is called for by the sign 7 placed above the group.

SEPULCHRAL MOUND (Lat. *sepulcralis*, relating to a tomb, from *sepulcrum*, *sepulchrum*, tomb, sepulchre, from *sepelire*, to bury). A mound erected as a memorial for the dead. The practice of rearing mounds of earth and stone over the dead may be traced to remotest antiquity and the lowest grades of human culture. The first and earliest type was merely a heap, without a central cavity or much attention to outward form. Here a single corpse is covered with a pile of rocks or a heap of dirt scraped up and carried in baskets. In the better forms the materials are selected and the surface covered with sods or trees. The original mound was conoid or the form of the body; but in later times geometric structures of exact outline were erected. Then came the log pen, the cyst of rough slabs, the laid up inclosure, the megalithic cell, the tomb of masonry, and the mausoleum covered with earth. In these various inclosures the dead were doubled up, laid out, heaped in ossuaries, or incinerated, the ashes being mingled with the soil or inurned. The mounds of America furnish a great variety of these sepulchral remains ranging from the mere heap to the squared pyramid. Great tumuli and barrows (q.v.) are found throughout Northern Europe from the British Isles to Ukraine, and they are to be seen in Northern Africa and in Asia. See BURIAL.

SEPULCHRE, THE HOLY. See HOLY SEPULCHRE.

SEPULVEDA, sā'pōōl-vā'dȧ, JUAN GINEZ DE (c.1490-1574). A Spanish historian, born near Cordova. He studied at Alcalá, and after living in Italy until 1536 returned to Spain as chaplain and historiographer to Charles V., and preceptor to his son, afterwards Philip II. His early polemical writings against Luther, and against Las Casas on slavery, brought him into prominence. He wrote, in addition to a *Life* of Cardinal Albornoz, *Historiæ Caroli V. Imperatoris Libri XXX.*, and *De Rebus Hispanorum Gestes ad Novum Orbem Mexicumque*. His works were published in 1780 in four volumes by the Royal Academy of Madrid.

SEQUA'NI. A tribe of ancient Gaul, described by Cæsar in the first book of his *Bellum Gallicum*. They seem to have been of Celtic stock, and to have inhabited the district later known as Franche-Comté and Burgundy. Their chief town was Vesontio (the later Besançon). They took their name from the river Sequana (now the Seine), which had its source within their territory. This district formed a separate province, called Maxima Sequanorum, under the Empire.

SEQUENCE (OF. *sequence*, Fr. *séquence*, from Lat. *sequentia*, sequence, from *sequi*, to follow; connected with Gk. ἕπεσθαι, *hepesthai*, Skt. *sac*, to follow, Goth. *saihwan*, OHG. *sehan*, Ger. *sehen*, AS. *sēon*, Eng. *see*). In liturgics, a hymn intro-

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duced in the Middle Ages as a continuation of the Alleluia before the gospel in the mass, probably with the original idea of supplying words for the protracted series of notes known as neumes (q.v.). They were also known, especially in England and France, as proses, because the earlier ones were not metrical. Notker, a monk of Saint Gall, was the earliest great composer of them, and his work spread very widely throughout Europe; by 1500 his beautiful sequence for Whitsunday, "Veni sancte Spiritus," was adopted in at least 150 dioceses and religious Orders. Adam of Saint Victor is the principal figure in the second period. The sequences were principally used in the north of Europe; they are rare in Italian and Spanish missals, and the Cistercians and Carthusians never adopted them. In 1570 the revised Roman missal limited the number of sequences to five, including the "Stabat Mater," "Lauda Sion," and "Dies iræ." As a term in the theory of music, a sequence denotes the frequent repetition of a musical phrase, each repetition ascending or descending by a certain interval. Although the older masters frequently made use of sequences, theorists were unable to explain their exact character. Fétis finally discovered that a sequence is a purely melodic, not a harmonic progression, and that therefore in this particular case the rules of strict harmony must be suspended. Consult: Daniel, *Thesaurus Hymnologicus* (Leipzig, 1844); Mone, *Lateinische Hymnen des Mittelalters* (Freiburg, 1853-55); Gautier, *Histoire de la poésie liturgique* (Paris, 1886).

SEQUESTRATION (Lat. *sequestratio*, from *sequestrare*, to surrender, lay aside, remove, from *sequester*, mediator, agent, probably from *sequi*, to follow). An equitable process directing a sheriff, or four or more commissioners, to seize and take possession of the property of a defendant, or person in contempt of court, and receive the rents and profits, if any, until some decree or order of the court is satisfied, or until litigation in regard to the property is determined. It was employed to enforce the payment of money damages, which are often granted as incidental to the main relief of a court of equity, and to enforce obedience to decrees of the court, where a person was in contempt. In a few States this process is still commonly employed for the above purposes, but in most jurisdictions the process of execution has superseded it, although, unless expressly abolished by statute, the courts of equity may still resort to it in the proper cases. See EQUITY; CONTEMPT; and the authorities there referred to.

SEQUIN (Fr. *sequin*, from It. *zecchino*, sequin, from *zecca*, Sp. *zeca*, *seca*, mint, from Ar. *sikka*, die for coins). A gold coin, first struck at Venice toward the end of the thirteenth century. It was about the size of a ducat (q.v.), and equivalent to $2.33 American. Coins of the same name, but varying in value, were issued by other States.

SEQUOIA (Neo-Lat., named in honor of *Sequoya*, or George Guess). A genus of coniferous trees closely allied to the cypress. Only two species persist, both in California. They are the big tree (*Sequoia gigantea*) and the redwood (q.v.) (*Sequoia sempervirens*). The former is the largest American forest tree and one of the largest in the world. The average height of the trees is said to be about 275 feet, although specimens exceeding 320 feet, with a trunk diameter of 30 to 35 feet near the ground, have been measured. The trees are buttressed at base, so that they lose their diameter rapidly for a few feet, after which they taper gradually and are frequently 100 to 150 feet without a branch. The wood is light, soft, coarse-grained, and durable, especially when in contact with the ground. The heart wood is red, turning darker upon exposure; the sap wood is thin and white. The bark of the tree is spongy and fluted, often two feet thick. The tree contains little resin and does not burn readily. The big tree is found only on the west side of the Sierra Nevadas, at elevations between 5000 and 7000 feet. It occurs in scattered groves along with other coniferous trees, in no place forming pure forests. These groves, of which there are about a dozen, occur from Placer to Tulare County, a distance of about 250 miles near the centre of the State. The Calaveras and Mariposa groves are the best known. The former contains about 100 trees of large size, and a considerable number of smaller ones. The tallest specimen now standing is the 'Keystone State,' which is 325 feet tall, and what is believed to be one of the finest specimens standing is the 'Empire State,' with a circumference of 94 feet. A fallen specimen known as the 'Father of the Forest' was broken in falling, but it is estimated as more than 400 feet tall. The Mariposa grove contains about 500 trees of all sizes, of which perhaps 100 are large specimens. A number of fine specimens are to be found in the State and National Forest Reserves, but the finest are upon private holdings. The discovery of the first of these big trees has been attributed to a hunter named Dowd in 1850, but it is claimed that John Bidwell actually visited the same grove, the Calaveras, in 1841, and to him should be given the credit of their discovery. The proper botanical name to be applied to this tree has been a subject of controversy. In England it is generally known under the name *Wellingtonia gigantea*, but as the tree does not differ from Sequoia the name was transferred to *Sequoia gigantea*. By some laws of nomenclature the name should be *Sequoia Washingtoniana*, but as the specific name gigantea is best known, it is here retained. The tree has been successfully grown in England and elsewhere. Some forest specimens are estimated to be from 1000 to 2000 years old.

SEQUOIA GIGANTEA.

The genus Sequoia appeared first in the Cretaceous beds of Atane, Greenland, and in the Potomac group of North America, and is represented by later species in the Tertiary of North America and Europe which are very similar to those remnant species now living in the Western United States. Still earlier ancestors were Lep-

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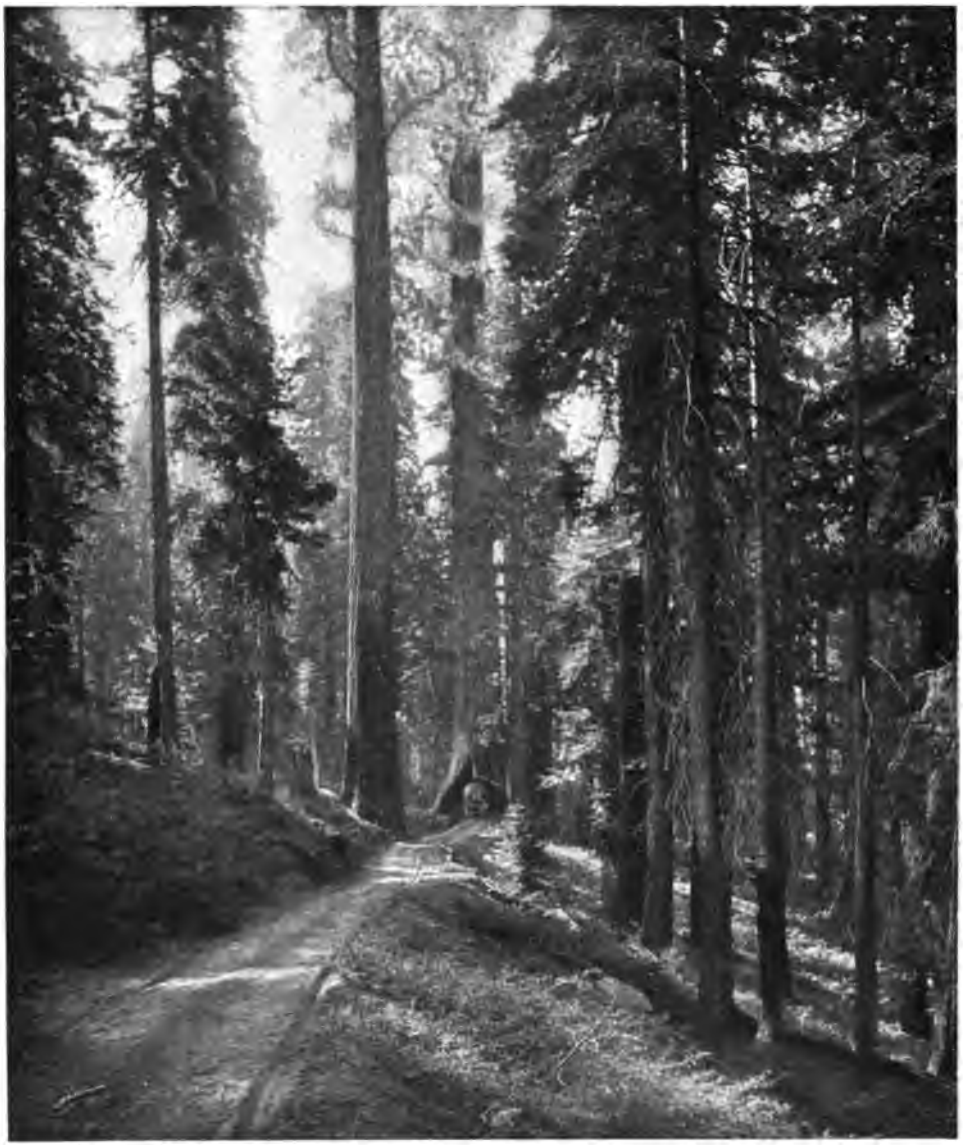

SEQUOIA

MARIPOSA GROVE OF BIG TREES, YOSEMITE VALLEY

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tostrobus and Swedenborgia of the Jurassic and Voltzia of the Triassic, all of which attained great size. See CONIFERÆ.

SEQUOYA, sē-kwoi'yȧ, or GEORGE GUESS (c. 1760-1843). A Cherokee mixed blood, famous as the inventor of the Cherokee syllabary. He was born about the year 1760 and lived as a boy with his mother at the Cherokee town of Tuskegee, close to old Fort Loudon, in East Tennessee. As he grew up he became a hunter and fur trader, but also developed a considerable mechanical ingenuity, especially in the making of silver ornaments. He was led by a chance conversation in 1809 to reflect upon the ability of the whites to communicate thought by means of writing, with the result that he set about devising a similar system for his own people. For this purpose he made use of a number of characters which he found in an old spelling book, taking capitals, lower case, italics, and figures, and placing them right side up or inverted, without any idea of their sound or significance in English use. Having thus utilized about thirty-five ready-made characters, he obtained a dozen or more by modifying some of these originals, and then devised others from his own imagination to make a complete syllabary of eighty-five characters, capable of expressing every sound in the Cherokee language. By means of this invention anyone speaking the language can learn to read and write it perfectly in a few days. Since then the same principle has been utilized by missionaries for several other Indian languages, notably the Cree and Chippewyan. After years of patient labor in the face of ridicule, discouragement, and repeated failure, he finally perfected his invention, and in 1821 submitted it to a public test by the leading men of the Cherokee Nation. Its great value was at once recognized, and within a few months thousands of hitherto illiterate Cherokee were able to read and write their own language. In the next year he visited the West, to introduce his system among those of the tribe who had removed to Arkansas. On a second visit in 1823 he decided to take up his permanent residence with the Western band. In 1839 Sequoya was instrumental in bringing about a union of feeling between the 'Old Settlers,' as the Arkansas band was then known, and the body of the nation, which had just then removed from their original territory in the East. Consult: Foster, *Sequo-yah, the American Cadmus and the Modern Moses* (Ithaca, N. Y., 1885); Mooney, *Myths of the Cherokee* (Washington, 1900).

SERAGLIO, sȧ-rä'lyō (It. *serraglio*, inclosure, seraglio, from ML. *serraculum*, spigot, Lat. *seracula*, little bolt, diminutive of *sera*, bolt, bar, from *serare*, to bind together, from *serere*, to bind, join; connected with Gk. εἴρειν, *eirein*, Skt. *sā*, to bind; confused in meaning with Ar., Turk. *sarai*, from Pers. *sarai*, palace, inn, seraglio). The collection of buildings with surrounding grounds which formerly constituted the Imperial residence of the Sultan at Constantinople. It is situated on the easternmost of the seven hills of the city, between the Sea of Marmora, the Bosporus, and the Golden Horn, and is surrounded by a wall more than two miles in circumference. Mohammed II. began the erection of a palace on this location in 1468, and occupied it during a portion of the year. Solyman II. (1520-66) greatly enlarged it and made it his habitual residence. Since 1839 it has not been occupied by the Sultan, and buildings and grounds are falling into decay. The Seraglio consists of two inclosures, an outer and inner; free access is allowed to the former, which constitutes nine-tenths of the whole. Among the buildings in the outer portion are several Imperial schools, a hospital, barracks, and the museum of Constantinople. Among the noteworthy structures of the inner portion are the Hall of the Divan, the Imperial Treasure House and Library, and the Bagdad Kiosk. Certain relics of the Prophet are kept here, among them the black mantle which he is said to have given to the poet Kaab. Annually on the fifteenth of Ramadan the Sultan comes in great state to render homage to this relic—the only time in the year at present when he visits the Seraglio or Stamboul. The Turks apply the name seraglio (or more properly serai) to any residence of the Sultan. In English it is often incorrectly confused with harem (q.v.). Consult Grosvenor, *Constantinople* (Boston, 1895), and for a description of the Seraglio in its greatest glory Tavernier, *Voyage en Turquie, en Perse, et aux Indes* (Paris, 1677-79).

SERAING, se-rȧN'. A town in the Province of Liège, Belgium, on the Meuse, four miles by rail southwest of Liège (Map: Belgium, D 4). It has a factory for the manufacture of steam machinery, locomotives, etc., which is probably the largest in the world. The town depends on these works for its prosperity, the company maintaining schools, hospital, orphan asylum, etc. In the vicinity are valuable coal mines, and one of the largest glass factories of Europe. Population, in 1900, 39,623.

SERAJEVO, sē-rä'yĕ-vō, or BOSNA-SERAI. The capital of Bosnia, beautifully situated in the midst of gardens on both sides of the Miljačka, 122 miles southwest of Belgrade (Map: Austria, F 5). The river is here spanned by several fine stone bridges. The town has been greatly advanced by modern improvements. Noteworthy structures are the Catholic cathedral (1889); the large sixteenth-century Mosque of Husref Bey; the town hall; the Governor's residence; and the museum with a collection of antiquities. The picturesque ruins of the old castle, erected by the Hungarians in the thirteenth century, crown the height above the town. Serajevo has a Catholic seminary. The principal industry is the manufacture of metal ware. There are also dyeing and silk-weaving establishments, extensive potteries, a large brewery, and a Government tobacco factory. Serajevo is an important commercial entrepôt, and the immense bazaar is the centre of a very lively trade. It is connected by rail with the Austro-Hungarian railroad system. There are valuable iron mines and mineral baths. Population, in 1885, 26,268; in 1895, 41,173.

SERAMPUR, sĕr'ŭm-pōōr', or **SERAMPORE**. A town in the Province of Bengal, India, 13 miles north of Calcutta, on the Hugli River (Map: India, E 4). It extends along the river front and is very picturesque. The most prominent feature is the Baptist College, occupying a site overlooking the river. It has a library with valuable manuscripts and a fine collection of portraits. Other objects of interest are the former residence of the Danish Governor, now the Gov-

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ernment building, and the old Danish church, with its memorial tablets to the early missionaries. Population, in 1901, 44,451. Serampur was a Danish possession, known as Fredericksnagar, until 1845, when it was ceded to the East India Company. It is noted as the centre of the Baptist missionary movement of the early years of the nineteenth century. Ward, Carey, Mack, and Marshman, the leaders of this movement, are buried here.

SERAO, sâ-rä'ô, MATILDA (1856—). One of the most prominent of modern Italian novelists, born at Patras, Greece. She first wrote short sketches for the Neapolitan papers, and was for a time connected with the editorial staff of the *Capitan Francassa*. Later, with her husband, Edoardo Scarfoglio, she founded the *Corriere di Roma* (afterwards *Corriere di Napoli*), and in 1891 founded the *Mattino*. As a novelist she shows in her earlier work unmistakably the influence of the French realists, notably Zola, whose *Ventre de Paris* she follows in spirit as well as title in her *Ventre di Napoli* (1885). A good many of her books deal with the various phases of Neapolitan life. In her later novels she devotes herself to psychological problems, which she handles with much subtlety and power. Among her best works are: *La conquista di Roma* (1885); *Vita e aventure di Riccardo Joanna; Il paese di Cuccagna* (1891); *Addio amore*. In her more recent book, *Al Paese di Gesù*, she seems to have joined the neo-mystic school of which Fogazzaro is a leading representative in Italy. In 1901 Serao's *Paese di cucoagna* appeared in English translation as *The Land of Cockayne*, in the same year, *The Ballet Dancer* (*La ballerina*), and *On Guard, Sentinel* (*All 'erte sentinella!*), and in 1902 the *La conquista di Roma* under the title *The Conquest of Rome*.

SER'APE'UM (Lat., from Gk. Σεραπεῖον, *Serapeion*, Σαραπεῖον, *Sarapeion*, from Σέραπις, *Serapis*, Σάραπις, *Sarapis*). A name signifying a temple of the god Serapis (q.v.). Several such temples existed in Egypt, the most remarkable being the Serapeum of Alexandria, said to have been one of the grandest buildings in the world. It was built by Ptolemy I. in the suburb of Racotis on the site of an older temple, and was richly adorned with sculptures and paintings. The temple was burned down in the reign of Marcus Aurelius, but was soon rebuilt; it was finally destroyed, in A.D. 391, by Bishop Theophilus of Alexandria. The Serapeum of Memphis (q.v.), situated near the site of the modern village of Saqqara (q.v.), was the funerary temple of the sacred bull Apis. It consisted of an extensive group of buildings, with pylons, an inner and an outer court, and the usual appurtenances of Egyptian temples, and was connected by an avenue of sphinxes with a small serapeum of the Greek period, before which stood eleven statues of Greek philosophers and poets arranged in a semicircle. Within the chambers of the Egyptian Serapeum was established a colony of hermits who lived in cells attached to the various chapels of the temple. A regularly organized monastic system prevailed among them, and there can be no doubt that they were the prototypes of the Christian monks and ascetics of a later period. Below the great temple were the subterranean tombs in which the mummies of the Apis bulls were deposited from the time of Amenophis III., or perhaps earlier, down to the Roman period. The earlier tombs are square chambers, hewn in the rock, and they were connected by shafts with chapels standing above them. In the nineteenth year of Rameses II. a subterranean gallery, about 110 yards long, was hewn out and flanked by some 40 chambers, each of which was walled up after receiving the remains of a sacred bull. In the reign of Psammetichus I. (q.v.) a new gallery was excavated upon a much more extensive scale, and additions were made to it from time to time by the Saitic and Ptolemaic monarchs. The Apis tombs were opened in 1851 by Mariette, who found some of the mummies still intact in the coffins in which they were buried. Among the many valuable relics found, the most instructive were the *Apis steles* or small tablets recording the exact dates of birth, enthronement, and burial of the sacred animals. These tablets furnish chronological data of the utmost importance; they are dated by the regnal years of the kings under whose rule the recorded events occurred, and they have thus served to determine with precision the duration of the reigns of many Pharaohs, and the order in which they succeeded each other. Consult: Mariette, *Mémoire sur la mère d'Apis* (Paris, 1856); id., *Le Sérapéum de Memphis* (ib. 1857); Wiedemann, *Aegyptische Geschichte* (Gotha, 1884-88); id., *Religion of the Ancient Egyptians*, translated (New York, 1897); Budge, *A History of Egypt* (ib., 1902).

SERAPH (Heb. *sārāph*, pl. *sĕrāphīm*). An order of celestial beings mentioned only once in the Bible (Is. vi. 2-6). From the description there given it would appear that they were conceived as human in form, having hands, faces, and feet, but having also wings. Of these they had six, or three pairs, with one pair covering their faces, with a second their feet, and flying with the third pair. They are ranged opposite each other and proclaim the holiness of Yahweh. They also carry out His commands. The origin of the word as well as of the idea is still a matter of conjecture. The word is rendered by Jewish commentators 'the brilliant ones,' but other scholars propose 'the lofty ones'; still others would change the text, reading *shĕrāthīm* for *sĕrāphīm*, and translate 'ministering ones.' So radical a procedure, however, is not called for, and since the underlying stem *sāraph* signifies to consume with fire, it seems reasonable to connect with the seraphim the notion of purification by fire and to regard them as the agents who bring about such purification—which as a matter of fact is the function assigned to them in Isaiah's vision (Is. vi. 6-8). There is evidently some relationship also between Isaiah's seraphim and the 'fiery serpent' (*sārāph*) referred to in Num. xxi. 6 and Deut. viii. 15 (cf. Is. xiv. 29; xxx. 6), which bites the Israelites in the desert. This seraph appears to have been originally a personification of the serpent-like lightning. The popular notion is transferred by the Prophet into the spiritual realm, and in this transfer all traces of the serpentine form disappear. A factor in bringing about this transfer may have been the Egyptian conceptions of winged griffins—called in Demotic texts *serb*—who act as guardians of tombs and temples. It is to be noted that winged men and beasts appear also on the Assyrian monuments. See CHERUB.

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SERAPHIM, Order of the. The oldest Swedish order, also called the Blue Ribbon. Its foundation is ascribed to Magnus Ladulås in 1260, and it was renewed by Frederick I. in 1748. The decoration, worn on a blue ribbon, consists of an eight-pointed cross with seraphs' heads and patriarchal crosses, bearing the letters JHS with three Swedish crowns.

SERA'PIS, or **SARAPIS** (Lat., from Gk. Σέραπις, Σάραπις). An Egyptian deity worshiped especially at Memphis and at Alexandria. The name is a compound of Osiris and Apis and in its earliest Greek form occurs as Osirapis, of which Serapis (Sarapis) is a corruption. The god, in fact, was the sacred bull Apis (q.v.), who, after his death, became one with Osiris and, under the name of Osiris-Apis (Egyptian *Oser-Hapi*), was worshiped as a god of the dead. The Serapeum, or temple of Serapis, at Memphis, enjoyed the reputation of special holiness and was visited by pilgrims from all parts of Egypt. The Greeks identified Serapis with their Hades, the King of the Underworld, and Ptolemy I. built the famous Serapeum of Alexandria upon the site of an older temple of the Egyptian god. This temple seems to have contained two statues of the god; one said to have come from Sinope, the other, representing the god as Hades with Cerberus, brought from Seleucia. The Alexandrian Serapis was therefore a fusion of the Greek and Egyptian divinities. Under the Romans when the worship of Serapis spread beyond its original territory, he, rather than Osiris, was regarded as the consort of Isis. Consult: Wiedemann, *Religion of the Ancient Egyptians*, translated (New York, 1897); Mahaffy, *The Empire of the Ptolemies* (New York, 1898); id., *A History of Egypt Under the Ptolemaic Dynasty* (ib., 1899); Milne, *A History of Egypt Under Roman Rule* (ib., 1898). See Serapeum.

SERBIAN LANGUAGE AND LITERATURE. See Servian Language and Literature.

SERBO-CROATIAN (or Serbo-Horvatian) **LANGUAGE.** The speech of about 8,000,000 people inhabiting the Kingdom of Servia, the Principality of Montenegro, the provinces of Bosnia and Herzegovina, Old Servia (Novibazar Kossovo), Croatia, and Slavonia, the southern part of Hungary proper, Istria, and Dalmatia.

With the Bulgarian and Slovenian it forms the so-called southern group of the family of Slavic languages (q.v.). Among the phonetic peculiarities of Serbo-Croatian are the frequent occurrence of the broad *a* for the *e* or *o* in the other Slavic languages, as Serbo-Croatian *otats*, 'father,' Russian *oshets*; the vocalic *r*, as Serbo-Croatian *srtse*, 'heart,' Russian *serdtse;* the change of *l* into *u*, when in the middle of a word, as Serbo-Croatian *vuk*, 'wolf,' Russian *volk*, and into *o* when final, as Serbo-Croatian *pisao*, 'I wrote,' Russian *pisal*. In morphology, the loss of the dual is almost complete, and the locative of nouns, as well as the supine and present passive participle in verbs, has also disappeared. The accent is entirely free, the Croatian, or Horvatian, generally agreeing with the Russian accentuation, the Servian proper usually following almost rigid laws. The existence of long and short vowels along with a musical pitch accent makes Serbo-Croatian one of the most expressive among the Slavic languages. The characters used vary with the religion prevailing; in the Croatian Catholic lands, the Roman alphabet is used, while the bulk of the Servians, belonging to the Greek Orthodox Church, use the ancient *Kirillitsa* (q.v.), modified by Karajitch (q.v.) in the early part of the nineteenth century. Consult: Vymazal, *Serbische Grammatik* (Brünn, 1882); Budmani, *Grammatica della lingua serbo-croata (illirica)* (Vienna, 1867); Partchitch, *Grammaire de la langue serbo-croate*, trans. by Feuvrier (Paris, 1877); Karajitch, *Serbisch-deutsch-lateinisches Wörterbuch* (3d ed., Belgrade, 1898); id., *Deutsch-serbisches Wörterbuch* (Vienna, 1872); Popovitch, *Wörterbuch der serbischen und deutschen Sprache* (2d ed., Pansova, 1886-95).

SERENA, sâ-rā'nyà, La. A town of Chile. See La Serena.

SERENADE (OF. *serenade*, Fr. *sérénade*, from It. *serenata*, serenade, from *serenare*, to make serene, from *sereno*, from Lat. *serenus*, calm, serene). Originally music performed on a calm night; hence a song given under the window of a lady by her lover. The modern serenade (or serenata) is a cyclical composition for full orchestra. It differs from the symphony in the greater number of its movements (5, 6, 7, or more) and in their freer construction.

SERES, sĕr'ĕs. A town in the Vilayet of Saloniki, European Turkey, 43 miles northeast of Saloniki (Map: Balkan Peninsula, D 4). It is protected by high walls, and contains a citadel, many handsome villas, and several mosques and churches. It is the centre of the Turkish woolen industry, and exports skins, cotton, wool, and tobacco. Population, 30,000.

SERETH, sĕr'ĕt. An important affluent of the Danube. It rises as the Great Sereth in the Austrian Crownland of Bukowina, flows southward through almost the whole length of Moldavia, and joins the Danube five miles above Galatz (Map: Balkan Peninsula, F 1). Its principal tributaries are the Little Sereth on the right, and the Suczava, Moldava, and Bistritz on the left. Total length, 291 miles.

SERF (OF., Fr. *serf*, from Lat. *servus*, servant, slave; connected with Av. *har*, to protect). In common usage, an unfree feudal dependent, who occupies a place in the social scale above the slave. The serf was usually a peasant bound to the land which he cultivated and for which he owed service and obedience to the lord in whom the ownership of the land was vested. The serf was frequently the product of the feudal system, and under a feudal organization of society the institution of serfdom, or villeinage, is seen in its most developed form. This article will treat chiefly of serfdom or villeinage as it existed in Western Europe.

The origin and development of villeinage in Western Europe has been a subject of violent dispute among historians. With the decay of the Roman power in the fourth and fifth centuries anarchy became prevalent, and there were many who were compelled to seek the protection of their more powerful neighbors. In return they performed such services as a freeman may perform. This institution was known as the *patrocinium*, and at first the relation terminated with the death of either party. Some of those who sought protection were also owners of small parcels of land, and such land was frequently

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handed over to the more p
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which the French serf never obtained. Moreover, in England the last known act of enfranchisement took place in the reign of Elizabeth.

In Germany serfdom was generally not of a very harsh kind, though it varied considerably in different parts of the country. In some portions of Prussia, however, peasants were, until 1773, in a state of absolute slavery. Serfdom was abolished in Prussia by the decree of October 9, 1807, which was issued through the influence of Stein and his associates. This declared that from Martinmas, 1810, all persons should be free in the States of Prussia. Subsequent enactments removed the social and property distinctions, which had separated the classes, and gave to every citizen the power to possess in fee simple all kinds of property. This legislation was generally imitated in the other German States. The remains of the German system of serfdom lingered until 1836 in Saxony, and until 1848 in Austria.

In Russia, where the feudal system never prevailed, and the early condition of the peasant was not a servile one, the reduction of the peasantry to a state of serfdom and their attachment to the soil were gradually effected, and did not prevail to a very great extent till the close of the sixteenth century. Peter the Great strengthened the attachment of the serf to the soil for fiscal reasons, and under Catharine II. the system reached its highest development, the serf being reduced to so low a level that he differed little, if at all, from a slave. Serfs were regarded by law as a part of the proprietor's working capital, and as such were bought and sold, sometimes with the land, and sometimes without it. The serf had no legal means of self-defense. Alexander I. introduced various improvements in the condition of the peasantry, particularly those belonging to the Crown, and in his reign serfdom was abolished in Courland and Livonia in order to weaken the power of the German nobles of those districts. The entire abolition of villeinage was effected by Alexander II. (q.v.) by a very sweeping measure. The manifesto of March 3 (February 19), 1861, gave personal freedom to more than twenty millions of serfs.

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SERGEANT (OF. *sergeant*, Fr. *sergent*, Prov. *servent*, *sirvent*, servant, from Lat. *serviens*, pres. part. of *servire*, to serve; connected with *servus*, slave). An important non-commissioned rank in the army; the next rank above that of corporal. Modern conditions demand more intelligence and military training than ever before, and have consequently greatly increased the duties of the grade. In extended movements, the sergeant is frequently compelled to act on his own initiative. In both the United States and the British armies, sergeants are distinguished by three chevrons; in the former they are of the color appropriate to the arm of the service and are worn on both sleeves of the coat. British sergeants wear three gold stripes or chevrons on the left arm only, and wear a silk sash, similar to that worn by the commissioned officer, except that it is worn over the right shoulder. See CHEVRONS; NON-COMMISSIONED OFFICER.

SERGEANT-AT-ARMS. In the English Court of Chancery, an officer who attends upon the Lord Chancellor with a mace, and executes various writs of process directed to him, apprehending, for example, persons pronounced in contempt of the court. A similar officer is attached to each House of Parliament and arrests those whom the House orders to be arrested. Sergeants-at-arms are also attached to the United States Senate and House of Representatives. They receive a salary of $4500 a year. They are authorized to preserve order in both Houses, and also have charge of the payment of members.

SERGEANT-AT-LAW. See SERJEANT-AT-LAW.

SERGEANT-FISH (so called from its lateral stripes, which resemble a sergeant's chevrons). A large strong voracious fish (*Rachycentron canadus*), of the southeastern coast of the United States, related to the mackerels, but superficially resembling a remora. Its habit of lingering about large fishes has led to its being named 'shark's waiting-boy;' and it is also called cobia and crab-eater. It reaches a length of 5 feet, and is olive brown, with obscurely striped sides.

SERGEANTY, GRAND (OF. *sergentie*, *serjantie*, from *sergeant*, sergeant, servant). A species of tenure by which many of the nobility of England held their lands of the King under the feudal system. After the Conquest the land was parceled out among the followers of the Conqueror according to their rank. At that time two species of tenure were introduced: tenure by knight service, consisting of an obligation to perform military service in time of war; and tenure by *sergeanty*, grand and petit, which involved, in addition to military service, some further service to the King in time of peace. A tenant by grand sergeanty was bound to render some personal service to the King, as to be his standard-bearer, cupbearer, or chamberlain, and to attend Court during certain seasons. Such tenure was also said to be *per baroniam;* the tenants became known as barons, and were higher in rank than the others. Although originally lands so held could not be divided or alienated, this was quietly done from time to time, and the burdens of the tenure gradually became extinct, and were finally abolished with the military tenures. However, the hereditary privileges and honors, as to be standard-bearer, etc., are still claimed by the great

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nobility on great occasions, as coronations. *Petty sejeanty* was an inferior service, as to render an arrow, or a pair of spurs, etc., to the King annually, and was, therefore, more in the nature of a socage tenure. See TENURE.

SERGEL, sĕr'gel, JOHAN TOBIAS (1740-1814). A Swedish sculptor, born at Stockholm. First a pupil of L'Archevêcque, he studied afterwards in Paris, and after 1767 in Rome, where during a sojourn of twelve years he acquired great reputation. Upon his return to Stockholm, whither he had been summoned by Gustavus III., he was appointed Court sculptor, professor, and in 1810 director of the Academy. The fifteen works of his preserved in the National Museum at Stockholm include a "Faun;" "Cupid and Psyche;" his masterpiece, "Diomedes Stealing the Palladium;" "The Muse of History Recording the Deeds of Gustavus Adolphus," a group of heroic size; and a colossal "Bust of Gustavus III." Besides these the "Monument of Gustavus III." (1808), at the foot of the Slottsbacke (Palace Hill), the "Resurrection," an altar-piece, and the "Monument to Descartes," both in the Adolf-Fredriks Kyrka, should be mentioned. For his biography, consult Nyblom (Upsala, 1877).

SERGI, sĕr'jê, GIUSEPPE (1841—). An Italian anthropologist, born in Messina, Sicily. He was educated at the University of Messina, where afterwards he became an instructor. Later he taught in Milan. In 1880 he was appointed to the chair of anthropology in the University of Bologna; in 1884 he accepted a similar professorship in the Royal University of Rome, and at the same time became director of the Anthropological Institute. He has devoted particular attention to the psychic traits as well as to the physical characters of the peoples of the East-Mediterranean region. His publications treat of archæology, criminal anthropology, and education. His best known works are *Elementi di psicologia* (1879), *Psychologie physiologique* (1887), *Principi di psicologia* (1894), *Specie e varietà umane* (1900), and *The Mediterranean Race* (1901), in Italian, English, and German editions.

SERGINSK, sĕr-gĕnsk', UPPER AND LOWER. Two industrial settlements in the Government of Perm, East Russia, 43 miles west-southwest of Ekaterinburg. They were founded by Demidoff (q.v.) in 1742 and still belong to a private company. Most of the inhabitants are engaged in the extensive iron works and the iron mines in the vicinity. The population of Upper Serginsk is 14,000, and of Lower Serginsk 8,000. The annual production of both towns amounts to over 15,000 tons of pig iron and 26,000 tons of steel.

SERGIPE, sĕr-zhĕ'pe. A maritime State of Brazil, bounded on the north by Alagoas, on the west and south by Bahia, and on the east by the Atlantic (Map: Brazil, K 6). Area, 15,090 square miles. It is the smallest State of the Republic. The coast region is flat and sandy; the interior is a sparsely watered plateau. The climate is hot and dry. The southwestern part affords good grazing land and is the seat of extensive stock-raising. In the eastern portion are cultivated sugar, cacao, tobacco, cotton, and manioc. The chief exports are sugar and rubber, and the centre of the commerce is the capital, Aracajû (q.v.). Population, in 1890, 310,926.

SER'GIUS. The name of four popes. SERGIUS I., SAINT, Pope 687-701. He was born at Palermo of a Syrian family and was ordained priest in 683. On the death of Pope Conon there was a contested election, and both factions finally united on Sergius. He refused to confirm the acts of the Trullan Council (see QUINISEXT), and the Emperor Justinian II. sent officers to Rome to seize him; but the soldiery of the exarchate rallied to his defence, and the Imperial emissary's life was only saved by the Pope's intervention. He consecrated Saint Willibrord, the Apostle of Frisia, and succeeded in terminating the schism in Northern Italy which grew out of the pretensions of the Patriarch of Aquileia.—SERGIUS II., Pope 844-47. He was of a Roman family and became archipresbyter under Gregory IV., whom he succeeded. Lothair I., displeased that he had been consecrated without waiting for Imperial sanction, sent his son Louis with an army to Rome. The Pope and the Roman nobles refused to swear fidelity to Lothair as King of Italy, but recognized him as Emperor, and Louis was solemnly crowned as King of the Lombards. In 846 Rome was attacked and devastated by Saracen hordes, who were finally driven off by Duke Guido of Spoleto, summoned by the Pope.—SERGIUS III., Pope 904-11. He was a Roman by birth, consecrated Bishop of Cære against his will by Formosus in 892 or 893, and elected Pope, on the death of Theodore II. in 897, by the Tuscan faction, but not recognized by the Emperor Lambert, who set up John IX. He returned to Rome in 904, overthrew the Antipope Christopher, and gained possession of the See. His pontificate was troubled, and his own character is said by some ancient writers to have been stained by the prevailing immorality.—SERGIUS IV., Pope 1009-12. He was made Bishop of Albano in 1004. On his election to the Papacy he changed his own name of Peter, being unwilling out of reverence to call himself Peter II. His power was limited in secular matters by the domination in Rome of the patrician John Crescentius and his family.

SERI, sā'rê. A wild and warlike tribe formerly holding a considerable territory on the west coast of Sonora, Mexico, together with the adjacent island of Tiburon, in the Gulf of California, but now restricted to the island. They are in the lowest culture condition, live in mere brushwood shelters, and shift constantly from place to place. Their ordinary implements are of stone or shell, their weapons being bows, clubs, and stones. The arrows are sometimes poisoned. They wear kilts of pelican skin and paint their faces with elaborate designs. They twist ropes from hair and vegetable fibre, make baskets and rude pottery, and use rafts or *balsas* woven from reeds. They know the use of the fire drill. Physically they are tall, well made, and of great agility. They seem to be untamably hostile to all aliens, and have no alliance or friendship with any other tribe. On the strength of a short vocabulary obtained by Bartlett in 1852 they were at first classed with the Yuman stock (q.v.), but later study of more adequate material shows that they form a distinct stock, which probably also included the now extinct Tepoca. They were formerly a large tribe, but have been nearly exterminated by the Mexicans. In 1852 they were still estimated at 500, but in 1894 had been

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reduced to less than 300. Consult McGee, *The Seri Indians* (Washington, 1899).

SERICITE (from Lat. *sericum*, silk, from Gk. σηρικός, *sērikos*, silky, seric, from Σῆρ, *Sēr*, Chinaman). A fine scaly variety of muscovite, characterized by a silky lustre. It is found chiefly near Wiesbaden, Germany. See MUSCOVITE.

SERICITE GNEISS, or SERICITE SCHIST. A metamorphic rock, composed essentially of the hydro-micaceous mineral sericite (q.v.) with quartz or quartz and feldspar. In some cases at least sericite gneiss has been produced by the mashing of granite and rhyolite (q.v.) under the action of mountain-building forces.

SERICULTURE. See SILKWORM; SILK.

SERIEMA. A bird. See CARIAMA and Plate of CRANES.

SERIES (Lat. *series*, row, succession, from *serere*, to bind; connected with Gk. εἴρειν, *eirein*, Skt. *sā*, to bind). In mathematics, a succession of terms formed according to some common law; e.g.: (1) in the series 1, 3, 5, 7,... each term is formed from the preceding by adding 2; (2) in 3, 9, 27, 81,...by multiplying by 3. A series in which each term after the first is formed by adding a constant to the preceding term is called an *arithmetic* series or progression; e.g. series (1) above. A series in which each term after the first is found by multiplying the preceding term by a constant is called a *geometric* series or progression; e.g. series (2) above. Any term t_n of an arithmetic series is given by the formula $t_n = a + (n-1)d$, in which a is the first term, d the common difference, and n the number of terms. The sum of n terms is given by the formula $s = \frac{n}{2}(a+l)$, l being the last term. In geometric series the corresponding formulas are $t_n = ar^{n-1}$, $s = \frac{l-a}{r-1}$, or $\frac{ar^n - a}{r-1}$. A series the reciprocal of whose terms form an arithmetic series is called a *harmonic* series or progression. Hence any term may be found by applying the formulas of arithmetic series to the reciprocals of its terms.

Although the above are the chief series treated in elementary algebra, there is an unlimited number of kinds. E.g. a type to which considerable interest is attached is the arithmetico-geometric series, in which the coefficients are in arithmetic series and the variable in geometric series. E.g. $1 + 2x + 3x^2 + \ldots (n-1)x^{n-2} + nx^{n-1}$. If the number of terms in a series is unlimited, it is called an *infinite* series. The general or nth term in such a series and the sum of n terms, n being indefinitely great, may or may not be determinate. Infinite series in which the values of t_n and s_n $(n = \infty)$ are indeterminate are of little value, but those in which a limit for s_n can be found are important. Thus in an infinite geometric series whose ratio is less than 1, $s = \frac{a}{1-r}$. E.g. to find the sum of the distances traveled by an elastic ball which falls 2 feet and bounds 1 foot and continues indefinitely to rebound one-half the distance fallen. The distance traveled in the first vibration is 3 feet, in the second 1½ feet, in the third ¾ feet, and so on indefinitely, whence for the whole distance $s_n = \frac{3}{1-\frac{1}{2}}$ or 6 feet. Recurring decimals may also be regarded to form an infinite series, and expressed as a fraction by means of the formula $s_n = \frac{a}{1-r}$. E.g. $.666.. = \frac{6}{10} + \frac{6}{100} + \ldots$, where $a = \frac{6}{10}$ and $r = \frac{1}{10}$. Therefore $s_n = \frac{\frac{6}{10}}{1-\frac{1}{10}} = \frac{2}{3}$.

An infinite series in which s_n, as n increases indefinitely, has a finite limit is called a *convergent* series, otherwise a *divergent* series. A series in which the sum is finite, but takes alternate values as n increases, as in $1 - 1 + 1 - 1 + \ldots$, is called an *oscillating* series.

The ability to determine what series are convergent and to determine the limit of s_n evidently conditions the utility of any series for the purpose of pure and applied mathematics. Thus the trigonometric functions $\sin x = x - \frac{x^3}{3!} + \frac{x^5}{5!} \ldots$, $\cos x = 1 - \frac{x^2}{2!} + \frac{x^4}{4!} \ldots$, the exponential series $e^x = 1 + x + \frac{x^2}{2!} + \frac{x^3}{3!} \ldots$, and the logarithmic series $\log(1+x) = \frac{x}{1} - \frac{x^2}{2} + \frac{x^3}{3} \ldots$ are available for those values only of the variables which render the series convergent.

A knowledge of elementary series is very old, the Pythagoreans (B.C. 550) having treated them quite comprehensively. (See NUMBER.) Euclid (c.300 B.C.) used geometric series, and infinite convergent series of the geometric type appear frequently in the works of Archimedes (c.280 B.C.). Among the Hindus, Aryabhatta, Brahmagupta, and Bhaskara treated arithmetic series, and Bhaskara discussed geometric series. The Arabs did little to advance the subject and the Europeans up to the sixteenth century had made no further progress. Saint-Vincent (1584-1667) and Mercator (c.1620-87) developed the series for $\log(1+x)$, and Gregory (1668) those for $\tan^{-1}x$, $\sin x$, $\cos x$, $\sec x$, $\csc x$. The terms convergent and divergent appear in the writings of Gregory.

The theory of infinite series may be said to begin with Newton and Leibnitz, and to have been further advanced by Euler. In 1812 Gauss published his celebrated memoir on the hypergeometric series (name due to Pfaff), which has since occupied the attention of Jacobi, Kummer, Schwarz, Cayley, Goursat, and numerous others. Cauchy (1821) may be considered the founder of the theory of convergence and divergence of series. He advanced the theory of power series by his expansion of a complex function in such a form. Abel was the next important contributor, and he corrected certain of Cauchy's conclusions. General criteria began with Kummer (1835), and have been studied by Eisenstein (1847), Weierstrass in his various contributions to the theory of functions, Dini (1867), Du Bois-Reymond (1873), and many others. Pringsheim's (from 1889) memoirs present the most complete general theory.

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The theory of uniform convergence was treated by Cauchy (1821), his limitations being pointed out by Abel, but the first to attack it successfully were Stokes and Seidel (1847-48). Semi-convergent series were studied by Poisson (1823) and Jacobi (1834). Fourier's series were investigated as the result of physical considerations, and Fourier (1807) set for himself the problem to expand a given function of x in terms of the sines or cosines of multiples of x, a problem which he embodied in his *Théorie analytique de la chaleur* (1822). He did not, however, settle the question of convergence of his series, a matter left for Cauchy (1826) to attempt and for Dirichlet (1829) to handle in a thoroughly scientific manner. Among other prominent contributors to the theory of trigonometric and Fourier series have been Riemann, Heine, Lipschitz, Schläfli, Du Bois-Reymond, Dini, Hermite, Helphen, Krause, Byerly, and Appell.

For an introduction to infinite series involving tests of convergence, applications to physics, and relations to integration, consult Osgood, *Introduction to Infinite Series* (Cambridge, 1897). An historical development of the subject is given by Reiff, *Geschichte der unendlichen Reihen* (Tübingen, 1889). Also by Bôcher, chap. ix. of Byerly's *Fourier's Series and Spherical Harmonics* (Boston, 1893). For history and theory, consult Merriman and Woodward, *Higher Mathematics* (New York, 1896); Jordan, *Cours d'analyse* (Paris, 1893). An elementary treatment is given in Chrystal, *Algebra*, vol. ii. (Edinburgh, 1889); Bonnet, "Mémoire sur la théorie genérâle des séries," in the *Mémoires couronnés* of the Brussels Academy (1850); Martone, *Introduzione alla teoria delle serie* (Catanzaro, 1891-94).

SERINAGUR, se-rē'nū-gūr'. The capital of Kashmir. See SRINAGAR.

SERINGAPATAM, se-rīn'gâ-pâ-tăm', or **SRIRANGAPATAM**. A town in the native State of Mysore, India, 9 miles northeast of the city of Mysore, on an island in the Kavery River (Map: India, C 6). It is poorly built and unhealthful. A portion of the palace of Tippu Sahib, within the inclosure of the old fort, still remains. Other objects of interest include the Darya Daulat Bagh, the handsome summer residence of Tippu; the Lal Bagh (garden) with the tombs of Tippu and his father, Hyder Ali; and the ancient temple of Vishnu Shri Ranga, from which the town derives its name. Seringapatam was the capital of Mysore until 1799. On May 4th of that year the town was stormed by the British, Tippu Sahib being killed. Population, about 12,000.

SERING'HAM. A town of Madras, India. See SRIRANGAM.

SERJEANT-AT-LAW. The highest rank of barristers (q.v.). It is a title of great antiquity, but now nearly extinct in England, although still common in Ireland. In early times the degree was conferred only on barristers of sixteen years' standing; but this qualification was dispensed with later. A serjeant was appointed by a writ under the great seal, upon the nomination of the Chief Justice of the Common Pleas, in whose court he was entitled, for centuries, to exclusive audience. Socially serjeants took precedence of King's counsel, while professionally the latter outranked the former, unless serjeants held special patents of precedence. The decay of this order in England is due in part to the fact that the Judicature Act of 1873 renders it unnecessary that a person should be admitted to the rank of serjeant before appointment to a Supreme Court judgeship, and in part to the abolition of the exclusive right of audience in the Common Pleas. Consult: Manning, *Antient Privileges of the Serjeants at Law* (London, 1840); Pulling, *The Order of the Coif* (London, 1884).

SERLIO, sâr'lyô, SEBASTIANO (1475-1554). An Italian architect and writer on art, born at Bologna. He worked as an architect at Pesaro from about 1510 until 1514, then, after having frequented in Rome the school of Peruzzi, he was employed at Bologna and Venice, and in 1540 went to Paris, where he became royal architect in 1541 and was engaged in the work on the Louvre and the Tuileries, and at Fontainebleau. He is remembered chiefly for his treatise on architecture, in which he embodied all the precepts of Vitruvius and which was published in seven books (Lyons, 1537-51, 1575). Consult Charvet, *Biographies d'architectes* (Lyons, 1869).

SERMONISM. See NOMINALISM.

SEROTINE (from Lat. *serotinus*, late, from *serus*, late). A large, dark-brown bat (*Vesperugo serotinus*) of particular interest for its very wide distribution, since it is known all over Europe, south of the Baltic, in Africa north of the equator, throughout the southern half of Asia, and in most of North America. It seems to be identical with our 'dusky' or 'Carolina' bat. Several color varieties are locally distinguished.

SEROUS FLUID (from Lat. *serum*, whey, serum; connected with Gk. *ὀρός*, *oros*, whey, Skt. *sar*, to flow). A thin, watery fluid occurring in various parts of the animal body, distinguished from mucus principally by its limpidity and by its being found in closed cavities only. It contains a little albumin, a trace of fibrin, about 6 per cent. of solid constituents, and 94 per cent. of water. Serous fluids have been arranged under three heads: (1) Those which are contained in the serous salt of the body, as the cerebro-spinal fluid, the pericardial fluid, the peritoneal fluid, the pleural fluid, the fluid of the tunica vaginalis testis, and the synovial fluid. (2) The fluids existing in the eyeball, the amniotic fluid, and transudations into the tissue of organs. (3) Morbid or excessive transudations, such as dropsical fluids, the fluids occurring in hydatids, and in blebs and vesicles on the skin, and transudations from the blood in the intestinal capillaries, as in cases of intestinal catarrh, cholera, or dysentery.

All these fluids bear a close resemblance to one another, both in their physical and chemical characters. In so far as relates to their physical characters they are usually clear and transparent, colorless or slightly yellow, of a slight saline, mawkish taste, and exhibiting an alkaline reaction with test-paper. They possess no special formal or histological elements, but on a microscopic examination blood-corpuscles, cells of various kinds, molecular granules, and epithelium may occasionally be observed in them. They also contain fats, animal soaps, cholesterine, extractive matters, urea (occasionally), the same inorganic salts which are found in the serum of

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the blood, and the same gases as occur in the blood. As rare constituents, and only occurring in disease, may be mentioned sugar, the biliary acids, salts of lactic and succinic acids, creatinine, mucine, etc.

SEROUS MEMBRANE. There are seven serous membranes in the human body, three being medium and single, while two are double and lateral. They are the arachnoid, the pericardium, and the peritoneum, with the two pleuræ and tunicæ vaginales testis. Thus they are connected, with the obvious view of facilitating motion and affording general protection, with all the most important organs in the body. Each sac or continuous membrane consists of two portions—a parietal one, which lines the walls of the cavity, and a visceral, or reflected one, which forms an almost complete coating or investment for the viscera contained in the cavity. During health the opposing surfaces of these serous membranes are in contact and only enough fluid is secreted to render them moist and capable of easy movements. After death from certain diseases, however, considerable fluid is frequently found, probably due to post-mortem exudation. An accumulation of fluid may occur during life. Of their structure it is sufficient to state that they consist essentially of (1) epithelium; (2) basement membrane; (3) a stratum of areolar or cellular tissue, which constitutes the chief thickness of the membrane, and is the constituent on which its physical properties are mainly dependent.

SER'OW (East Indian name). One of a group of goat-antelopes (genus Nemorhœdus) nearly allied to the gorals (q.v.), but more shaggy. They inhabit Southeastern and Eastern Asia, and make their home upon high and difficult mountains, where they go about in pairs or family parties, much after the manner of the wild sheep. The common serow (*Nemorhœdus bubalinus*) is an inhabitant of the Himalayan Mountains, and is a rather large, ungraceful animal with coarse blackish and reddish hair, and with rough black horns about a foot long, standing upright upon the head, with a backward curve. Another well-known species is the 'cambing-utan' (*Nemorhœdus Sumatrensis*), which inhabits hilly districts from Eastern Tibet southward to Sumatra. Other smaller species are known in Japan and in Formosa. Consult Blanford and other writers upon East Indian zoölogy, and Kinloch, *Large Game Shooting in Thibet and Northern India* (London, 1885). See Plate of GOAT ANTELOPES.

SERPA PINTO, sĕr'pȧ pēn'to, ALEXANDRE ALBERTO (1846-1900). A Portuguese explorer. He entered the Royal Military College in Lisbon, and in 1864 became an ensign. He went from Benguela to Durban, across the continent of Africa, in 1877-79. This expedition he described in a volume translated into French and German (1881-82). In 1884-86, accompanied by Cardozo, he led another expedition to Mozambique, where the Portuguese power was extended to Lake Nyassa. In 1889 he went once more to Africa, but was finally recalled in 1890 on account of England's opposition to his strongly Portuguese policy in Matabeleland.

SERPENT. See SNAKE.

SERPENT (OF., Fr. *serpent*, from Lat. *serpens*, creeping, snake, pres. part. of *serpere*, to creep; connected with Gk. *ἕρπειν*, *herpein*, Skt. *sarp*, to creep). A powerful bass musical wind instrument, consisting of a tube of wood covered with leather, furnished with a mouthpiece like a trombone, ventages, and keys, and twisted into a serpentine form, whence its name. Its compass is from ,B♭ to b♭¹. When skillfully played it exhibits the most startling inequalities of tone, in consequence of there being three notes, d, a, d, much more powerful than the others. The serpent was invented in 1590 by Edme Guillaume, a canon of Auxerre in France.

SERPENTARIA (Lat., snakeweed), or VIRGINIA SNAKEROOT. The root of Aristolochia serpentaria and other species of Aristolochia. It contains a volatile oil, a resin (a camphor) and a bitter principle (*aristolochine*). It has a pungent odor and a warm camphoraceous taste. In small doses it acts as a simple bitter, increasing the appetite, assisting digestion, and mildly relaxing the bowels. In large doses it causes nausea, vomiting, and diarrhœa. It is a heart stimulant and a cerebral excitant, and in large doses causes fullness of the head, vertigo, and exhilaration. It is an aphrodisiac, and also a diuretic. Its principal use is in bronchitis, in which it increases the bronchial secretion. There are three official preparations: the infusion, the fluid extract, and the tincture.

SERPENT-CHARMING. See SNAKE-CHARMING.

SERPENT-EAGLE. A crested and spotted eagle of the East Indian and African genus Spilornis, the species of which include snakes in their food. The largest and best known by this name is the 'cheele' (*Spilornis undulatus*) of India and eastward, which is brown with a black and white head, round white spots on the lower surfaces, and a broadly banded tail. The same name is given to the harrier eagles (Batastur), and especially to the secretary-bird (q.v.).

SERPENTINE (OF., Fr. *serpentin*, from Lat. *serpentinus*, relating to a serpent, from *serpens*, creeping, snake). A hydrated magnesium silicate mineral that crystallizes in the monoclinic system. It has a resinous to greasy and earthy lustre, and in color ranges through the different shades of green to brown, and sometimes yellow. Serpentine is rarely found crystallized, as it most commonly occurs in fibrous or lamellar aggregations. It takes a high polish, and is frequently employed as a material for ornaments. Serpentine frequently occurs in sufficient masses to form rocks, and in such cases it is generally associated with other minerals, viz. fibrous hornblende, talc, calcite, magnesite, chlorite, chromite, and oxides of iron, with residual portions also of augite, olivine, and hornblende crystals. The color of the rock, which is generally some variety of green, and the streaks of brown iron oxide, are responsible for the name serpentine. As a building stone, serpentine has great toughness and durability, combined with beauty of color, and being soft, is easily cut. It not infrequently contains, however, numerous crystals of a variety of garnet known as pyrope (Bohemain garnet, Cape ruby), which, while adding some beauty to the stone, offer by their extreme hardness a serious obstacle to its working. The fibrous variety of serpentine, asbestos (q.v.), is utilized in the manufacture of fire-proof materials. Serpentines are the principal source of

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chromite, and deposits of nickel and platinum are sometimes associated with these rocks. Serpentine with calcite, magnesite, or dolomite forms a beautiful mottled or veined rock to which the name ophiolite or ophicalcite, or, more commonly, Verde antique, is given. This material is used for ornamental pillars and decorative purposes.

SERPENT MOUND. A remarkable earthwork near Peebles, Adams County, Ohio, 71 miles east of Cincinnati. It is in the form of a huge serpent, 1000 feet long, 5 feet high, and 30 feet wide at the base. The tail ends in a triple coil, and between the open jaws lies an egg-shaped mound 109 by 39 feet. It is supposed to be the work of the Mound Builders (q.v.). See ARCHÆOLOGY, AMERICAN.

SERPENT-WORSHIP. See NATURE-WORSHIP; OPHITES.

SERPETTE, sâr'pĕt', GASTON (1846—). A French composer, born at Nantes. He studied at the Paris Conservatory (1868-71) under Ambroise Thomas, and won the Grand Prix de Rome with his cantata *Jeanne d'Arc*. In 1874 his first opera, *La branche cassée*, was produced in Paris, and he subsequently brought out more than thirty similar works, of which the best known are *Le carillon* (1896), *Cendrillonnette* (1890), and *La dot de Brigitte* (1895).

SERPULA (Neo-Lat., from *serpere*, to creep). A marine annelid worm which secretes a tubular calcareous shell, more or less coiled, and often forming large detached masses of reddish rock. The large, solid limestone tubes of these worms materially assist in building up coral reefs, especially on the coast of Brazil. Serpulæ have been noticed by A. Agassiz to often form on coral reefs incrusting masses of considerable extent. Serpulæ occur at great depths in the Gulf of Mexico, while some were dredged by the *Challenger* Expedition at depths of nearly 3000 fathoms. A mass of serpulæ with all their crimson tentacles expanded is a very beautiful object.

A GROUP OF SERPULÆ.
The worms (*Serpida vermicularis*) are shown with expanded tentacles, as if under water.

SERRA, sĕr'rà, MIGUEL JOSÉ. See JUNIPERO.

SERRADELLA, or **SERRADILLA** (Port. *serradilla*, diminutive of *serrado*, serrate, from Lat. *serratus*, saw-shaped, from *serra*, saw), BIRD'S-FOOT (*Ornithopus sativus*). An annual leguminous plant indigenous to Southern Europe and Northern Africa, cultivated for forage, hay, and green manuring. It prefers a moist climate and a sandy soil of good tilth. When broadcasted the land is harrowed and sometimes rolled to press the seed into the soil. In drilling the seed is planted about an inch deep. Two cuttings are obtained during the season. If sown about April 1st it can be used for green forage in July and a second cutting may be obtained in September. It is cut for hay at the close of the blossoming period.

The green crop (cut when in bloom) has the following average composition: Water, 79.9; protein, 2.9; fat, 0.7; nitrogen-free extract, 10.0; crude fibre, 3.4; ash, 3.1 per cent. The hay contains: Water, 9.2; protein, 15.2; fat, 2.6; nitrogen-free extract, 44.2; crude fibre, 21.6; and ash, 7.2 per cent. Like other leguminous crops, it has a fairly high protein content. In feeding value it does not differ greatly from red clover. It has the advantage that it may be fed up to nearly the end of the blooming period without deterioration. When the hay is cured care must be taken to prevent loss due to the breaking of fine leaves and stems.

SERRA DO MAR, sĕr'rà dô mär. The southern division of the Brazilian Coast Range, running along the southeastern coast of the country through the States of Paraná, São Paulo, and Rio de Janeiro. To the south, in Santa Catharina and Rio Grande do Sul, runs the somewhat distinct range known as the Serra Geral, while the northern division of the Coast Range bends west toward the Serra da Mantiqueira, which runs parallel with the Serra do Mar, separated from it by the valley of the Parahyba River. The range is the outermost escarpment of the great Brazilian plateau, and forms the divide between the Paraná River and the very short streams running into the Atlantic Ocean. Near Rio de Janeiro, where it reaches its highest elevation (from 6000 to 7000 feet), it is very rugged with numerous sharp granite crags, which from a distance suggest the pipes of an immense organ, whence this portion has been called the Organ Mountains.

SERRANIDÆ (Neo-Lat. nom. pl., from Lat. *serra*, saw). The family of sea-bass (q.v.), many species of which are called 'serranos' by the fishermen of Spanish America.

SERRANO Y DOMINGUEZ, sĕr-rä'nô ê dô-mĕn'gâth, FRANCISCO, Duke de la Torre (1810-85). A Spanish statesman and general, born near Cadiz. He fought against the Carlists from 1833 to 1839, and attained the rank of brigadier-general. Elected to the Cortes from Malaga in 1839, he joined with Espartero in bringing about the overthrow of the Queen mother Christina in 1840, but three years later turned against the regency of Espartero and was Minister of War for some time after the beginning of the personal reign of Isabella II. He became lieutenant-general in 1847, captain-general of the army and military Governor of New Castile in 1856, Ambassador at Paris in the following year, and from 1859 to 1862 was Captain-General of Cuba. His services in the reconquest of Santo Domingo gained him the ducal title, and on his return to Spain in 1863 he was made Minister of Foreign Affairs. A faithful follower of O'Donnell, he succeeded the latter in 1867 as chief of the Liberal Union, and in spite of his intimate relations with Queen Isabella plotted assiduously against her Government. With other leaders of the Opposition he was transported to the Canary Islands in July, 1868, but returned to Cadiz in September after the outbreak of the military revolution, assumed charge of the movement together with Prim, Topete, and Sagasta (qq.v.),

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and at the head of the revolutionary forces defeated the royal troops at Alcolea (September 28th). Isabella fled to France and Serrano was declared by the Cortes Regent of the kingdom in June, 1869, having acted in the interval as chief of the provisional Government. Under King Amadeus he was at the head of two short-lived Ministries (January-July, 1871; June 1872), and carried on an active campaign against the Carlists (1872). Serrano looked with disfavor upon the establishment of the Republic, following the abdication of Amadeus, and upon the overthrow of the Government by General Pavia in January, 1874, became chief of the executive, holding office till the accession of Alphonso XII. He died in Madrid.

SERRET, se-râ', JOSEPH ALFRED (1819-85). A French mathematician, born in Paris, and educated in the Ecole Polytechnique. In 1861 he became professor at the Collège de France. Serret's mathematical text-books are very valuable. The following list comprises his most important treatises: *Cours d'algèbre supérieure* (4th ed., 1879); *Traité de trigonométrie* (7th ed., 1888); *Eléments de trigonométrie* (1853); *Cours de calcul différential et intégral* (4th ed., 1894). Serret also edited the works of Lagrange (7 vols., 1867-92) and Lacroix's *Calculus* (1881).

SERTORIUS, QUINTUS. A Roman commander in the latter years of the Republic. He fought, B.C. 105, in the disastrous battle on the Rhone, in which the Roman proconsul, Quintus Servilius Cæpio, was defeated by the Cimbri and Teutones, and took part in the splendid victory at Aquæ Sextiæ (now Aix), B.C. 102, where Marius annihilated the Cimbri and Teutones, and on the breaking out of the sanguinary struggle between the party of the nobles under Sulla (q.v.) and the popular party headed by Marius (q.v.), B.C. 88, he espoused the cause of the latter. No other Marian general held out so long or so successfully as he against the victorious oligarchy. He fought in conjunction with Cinna the battle at the Colline Gate (B.C. 87) which placed Rome at the mercy of the Marians, but he had no hand in the bloody massacres that followed. He got his own troops together, and slew 4000 of the ruffianly slaves whom Marius was permitting to plunder and ravish at will through the city. On the return of Sulla from the East (B.C. 83), Sertorius withdrew into Etruria, and thence he went to Spain, where he continued the struggle in an independent fashion. At the invitation of the Lusitanians, he collected an army composed of natives, Libyans, and Romans, and after a time became the virtual monarch of the whole country. In B.C. 76 Pompeius was sent against Sertorius, but the latter drove him over the Iberus (Ebro) with heavy loss; nor was the campaign of the following year (B.C. 75) more favorable. Finally Perperna and other Roman officers of the Marian party who had fled to Sertorius in B.C. 77 assassinated him in his own tent in B.C. 72. Plutarch wrote Sertorius's *Life* and Corneille made him the subject of a tragedy.

SERUM (Lat., whey, serum). See BLOOD; SERUM THERAPY.

SERUM THERAPY. As stated in the article on IMMUNITY, the accepted theory of immunity is the antitoxin theory, in accordance with which theory it is believed that artificial immunity may be acquired through the introduction of attenuated cultures of microörganisms into the animal body. By this means the body is rendered immune to virulent forms of these organisms, through the antitoxins developed in the blood. The use of blood-serum containing antitoxins in the treatment or prevention of disease is called serum therapy.

Dr. Nicolas Lambadarios, of the University of Athens, has published a volume on the serum therapy, organo-therapy, antirabic and antileprous treatment of the old Greek physicians. Galen used the flesh of the viper's body as an antivenene. Mithridates fortified himself by taking all the known antidotes, and experimented also upon condemned criminals, finally succeeding in rendering himself immune to snake-bite. For the latter purpose he took the blood of animals which fed on venomous snakes. Attalus, King of Pergamon, Andromachus, Nero's chief physician, and Galen used similar antidotes. The discovery by Pasteur in 1857 of the bacterial origin of fermentation led to the discovery of different antitoxins and the establishment of serum therapy in these latter days.

BLOOD-SERUM. The germicidal action of blood-serum has been tested upon cultures of staphylococci, streptococci, typhoid bacilli, and colon bacilli. Blood-serum from healthy persons shows practically no germicidal power over the staphylococcus or streptococcus, but a marked germicidal action on the typhoid bacillus. Blood of cachectic people suffering from various diseases also exhibits marked germicidal power over the typhoid and colon bacilli. Blood removed from persons in the death agony or a few hours after death is strongly germicidal against typhoid and colon bacilli, but not actively so toward staphylococcus or streptococcus.

In preparing serum for therapeutic use the same general methods are employed in various productions. The following description of the preparation of anti-pneumococcic serum will serve as an example of the process:

ANTI-PNEUMOCOCCUS SERUM. Violent bouillon cultures of pneumococci (the bacteria causative of pneumonia) are injected into a horse, after the organisms in the culture have been killed by prolonged heating at 60° C. After the animal has obtained a certain amount of tolerance to these injections, living cultures of pneumococci are injected in increasing quantities until such injections fail to show constitutional symptoms. Rabbits are infected with living pneumococci meanwhile. From time to time the horse serum is injected into these rabbits. Where the serum of the horse is found by experiment to protect rabbits so that infection does not occur after injection of living pneumococci it is withdrawn from the horse for use, preserved with an antiseptic and bottled. Differing reports have been made as to the efficacy of this serum. It was used first in 1896 by Pane and De Renzi of Naples. Conflicting reports have been received regarding the results; but it is believed by successful experimenters in Naples, Munich, and Berlin that if not deteriorated by age, if used early and in large doses, it will always ameliorate if not cure lobar pneumonia.

ANTIVENENE. Dr. Albert Calmette, of the Pasteur Institute at Lille, France, devised a serum obtained from animals inoculated with rattlesnake poison, termed antivenene. This is not a

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true antitoxin, and in cases of snake-bite it apparently produces temporary cell stimulation instead of immunity. It should be used within 80 or 90 minutes after the reception of the poison in dosage of 10 c.c. hypodermically. Antivenene is to be issued to all the military hospitals in India, in which country the mortality from snake-bites during the 10 years preceding 1900 averaged 12,000 annually.

ANTICHOLERA SERUM. A series of experiments with this serum has been made at Calcutta, where cholera has been very prevalent and fatal for years among the coolies employed by the tea planters, with a result of a reduction of mortality from cholera of 72 per cent.

ANTITUBERCLE SERUM. The best figures attainable regarding the use of antitubercle serum are those of Stubbert, formerly of the Loomis Sanitarium, Liberty, N. Y., who reports marked improvement in 78 per cent. of the cases in which the serum was used.

ANTITYPHOID SERUM. This serum has been used extensively in Netley Hospital, England, and among British troops in India and South Africa as an inoculation to prevent contraction of typhoid. Less than 1 per cent. of the inoculated men fall victims to the disease, and of these less than 25 per cent. die; while of uninoculated men over 2½ per cent. contract the disease, and of these over 22 per cent. die.

DIPHTHERIA ANTITOXIN. The best known antitoxin is that used in combating diphtheria, and obtained from serum of animals which have been inoculated with cultures of the Klebs-Lœffler bacillus. While there are a few men of ability and experience who deny its efficacy, a vast number who have thoroughly tested its usefulness contribute an overwhelming and convincing mass of evidence in its favor. It is given by hypodermic injection, preferably between the shoulder blades, as early as diagnosis is made, and is of rapid efficacy in children. The mortality from diphtheria in cases treated with antitoxin is from 9 to 13 per cent., against 35 to 40 per cent. in cases treated by other methods.

ERYSIPELAS SERUM. For purposes of immunizing as well as for curative endeavor in any stage of an attack Marmorek's serum is used. It is composed of two parts of human blood serum mixed with bouillon, one part, sterilized and used in fluid form.

ANTISTREPTOCOCCUS SERUM. Many diseases become rapidly fatal through the virulence of streptococcus infection added to the original bacterial invasion. Scarlet fever, diphtheria, and tuberculosis are almost always complicated by streptococcal infection, while erysipelas, phlegmon, septicæmia from infected wounds, and also most cases of puerperal septicæmia are directly caused by the streptococcus bacillus. Marmorek's serum very frequently effects their cure; but better results have been obtained from an antistreptococcal serum, which has reduced the mortality of puerperal septicæmia to 25 per cent. Daily injections for at least a week appear to be necessary.

ANTITETANIC SERUM. It was not till 1897 that pure cultures of the germ of tetanus were made by Kitasato, although it was discovered in 1894 by Nicolaier. Formerly the disease was almost uniformly fatal. In the United States this mortality has been reduced to less than 35 per cent., through the use of the serum.

SARCOMA ANTITOXIN. A mixture devised by Coley, of New York, from cultures of bacillus prodigiosus has been successful in a fair proportion of cases.

CARCINOMA ANTITOXIN. Reynier, of France, has reported success with injections of a serum in cases of carcinoma. His serum is that obtained by Wlaeff from the inoculation of birds with blastomycetes isolated from human cancers.

TRUNECK'S SERUM. A preparation improperly termed 'inorganic serum' has been used by Truneck and others by hypodermic injection in cases of arteriosclerosis. It is a solution containing the sulphate of chloride, phosphate, and carbonate of sodium, with sulphate of potassium. It increases the alkalinity of the blood and is supposed to dissolve phosphatic deposits in the walls of the vessels.

ANTIPEST SERUM AND HAFFKINE'S FLUID. Yersin's antipest serum is blood-serum taken from horses that have been inoculated with the plague. Hypodermic injection of the serum causes immediate immunity, which, unfortunately, lasts only 12 to 14 days. A difficulty in securing acquiescence in repeated injections at once arises, and as a popular treatment it is under a disadvantage. It is, however, the only actual remedy for the plague after it has appeared, for if given early in the disease it is curative. Haffkine's fluid is a liquid in which the bacillus of plague has been cultivated and rendered virulent by special methods, the bacilli after abundant growth being killed by an exposure of the culture to a temperature of 70° C. for several hours. Inoculation with Haffkine's fluid confers immunity which lasts from a few days to several months. A great disadvantage in its use lies in the facts that during immunization the person is more susceptible to plague; and if he has already contracted even a mild form the inoculation might be fatal. Authorities recommend the provision of antipest serum for prompt use in order to avert an epidemic in the first cases and the employment of Haffkine's fluid to inoculate the people dwelling in localities threatened with an invasion of the disease.

SERUMS FOR THE LOWER ANIMALS. The Bureau of Animal Industry of the United States Department of Agriculture has been for years experimenting with serums made from the causative bacilli of hog cholera and swine plague, with a resulting recovery of 80 per cent. of the treated animals, against a recovery of from 15 to 29 per cent. of animals not treated. A serum devised by Loeffler and Uhlenhuth, of Austria, gives immunity for 4 to 8 weeks to animals exposed to foot-and-mouth disease. See VACCINATION, and each of the diseases mentioned; ANTITOXIN; TOXIN. Consult: Sternberg, *Immunity, Protective Inoculations in Infectious Diseases, and Serumtherapy* (New York, 1895); Landau, *Die Serumtherapie* (Berlin and Vienna, 1900); Stetson, *Serumtherapy in the Light of the Most Recent Investigations* (Providence, 1902).

SERVAL (South African name). A large, long-legged African wildcat (*Felis serval*), which may reach 40 inches in length, with a tail 16 inches long. It is varying tawny in color, with black spots, tending to form two longitudinal bands on the back, and rings on the tail. Its fur, known in trade as 'tiger-cat,' may be recognized by two characteristic horizontal black bands on the upper inner surface of

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each fore leg. It is found throughout Africa, but its habits are little known.

SERVANT. See MASTER AND SERVANT.

SERVE'TUS, MICHAEL, or, in his native Spanish, MIGUEL SERVETO (SERVEDE) Y REYES (c.1511-53). A celebrated antitrinitarian theologian and physician, born at Tudela in Navarre. He began his studies at Saragossa and entered the services of Quintana, later confessor of Charles V., with whom he went to Toulouse in 1528, and there began the study of law. In a short time, however, he gave himself entirely to the knotty points of the Reformation doctrines. In 1530 he went to Basel to hear Œcolampadius, and thence to Strassburg, where Bucer and Capito taught. His daring denial of the doctrine of the Trinity frightened or angered these divines to such a degree that they denounced him as 'a wicked and cursed Spaniard.' Servetus appealed from their judgment to that of the public in his *De Trinitatis Erroribus Libri VII.* (1531) and his *Dialogorum de Trinitate Libri II.* (1532); but the public thought as little of his teaching as the theologians; and to avoid the odium which it had occasioned he changed his name to Michel de Villeneuve and fled to Paris, where he began the study of medicine. In 1534 he went to Lyons, where he brought out an edition of Ptolemy's geography (1535; 2d ed. 1541); in 1536 he returned to Paris, resumed his medical studies, and received his degree in 1538. In 1537 he attacked Galen and the faculty in a medical work entitled *Syruporum Universa Ratio.* As a physician Servetus possessed no small ability and practiced with success; he is believed by some to have discovered the circulation of the blood. In 1538 he went to Charlieu, and in 1541 found an asylum in the palace of Pierre Paulmier, Archbishop of Vienne, supporting himself by his medical skill and literary work. In Vienne he published in 1542 a new and elegant edition of the Latin Bible of Pagninus with notes, which were not all original. At Vienne he also wrote his famous *Christianismi Restitutio* (first published, anonymously, in 1533). Its celebrity is due more to the fact that it sealed the fate of the author than to its intrinsic merits, the ideas being obscure and the style incorrect. Possibly at the instigation of Calvin, Servetus was arrested and brought to trial at Vienne. On June 17, 1553, he was condemned to be burned, but before this he had made his escape and was endeavoring to reach Italy. On the way he was discovered in Geneva and was imprisoned by Calvin's order. After a trial lasting two months he was condemned as a heretic and was burned at the stake on October 27, 1553. (For further details, see article CALVIN.) On October 27, 1903, an 'expiatory' monument to his memory was unveiled in Geneva. Consult: Tollin, *Das Lehrsystem Michael Servetus* (Gütersloh, 1876-78); Willis, *Servetus and Calvin* (London, 1877). The *Restitutio* has been twice reprinted, first by Dr. Meade (incomplete, as it was suppressed by order of the Bishop of London and burned, 1723), and again by Murr (Nuremberg, 1790); it has been translated into German by Spiess under the title *Die Wiederherstellung des Christenthums* (Wiesbaden, 1892-96).

SER'VIA (Serv. *Srbija*). A kingdom in the northwestern part of the Balkan Peninsula, bounded by the Kingdom of Hungary on the north, Rumania and Bulgaria on the east, Turkey (the Vilayet of Kossovo and the Sanjak of Novibazar) on the south, and Bosnia on the west. The Danube and its tributary, the Save, bound the country on the north; the Danube separates it from Rumania; and the Drina, an affluent of the Save, forms most of the western boundary. The Timok, an affluent of the Danube, flows about 25 miles on the eastern border. Area, 18,621 square miles.

Servia is mountainous. The Morava valley, with its numerous tributary valleys from west and east, stretches through the land from the southeast to the middle of the northern border, uniting with that of the Danube. The north central section in the Danube valley and the northwest section in the Save valley contain the only extensive lowland regions, which are characterized by Quaternary alluvium. Near the centre of the kingdom the southern and the western forks of the Morava come together, the one entering from Kossovo, the other rising in the Bosnian watershed. The mountains of Western Servia belong to the Dinaric system and present Mesozoic and Paleozoic strata and serpentine uplifts. On the boundary of Novibazar stands the mountain wall of Golija-Planina (6400 feet), where the western Morava rises. Adjacent in the southeast, across the narrow mountain valley of the Ibar, is the lofty Kopaonik-Planina (7100 feet)—the highest region in Servia. Generally in this southwestern part of the kingdom crystalline schists are prominent. Between the western Morava and the valley south of Belgrade is the mountain region of Sumadija, the heart of Servia, culminating in the Rudnik, nearly 4000 feet. This is a heavily forested territory, oaks and beeches predominating. The mountains east of the Morava belong to the Southern Carpathians and to the Balkans. The former of these systems in Servia is a continuation of the Banat region, and the Danube pierces here through the imposing gorge known as the Iron Gate. The formations here are of cretaceous limestone and of various schists interrupted by volcanic stone and ore strata and hot springs are frequent. The highest elevation in Eastern Servia is not far from the southeast border—the Suva-Planina, 6600 feet.

Servia is a well-watered country, belonging entirely to the basin of the Danube. The wide, fertile valley of the Morava represents the largest cultivated territory. The climate is moderate in the Danube Valley and somewhat cold in the mountains. It is healthful save in the lowlands adjacent to the Danube. The rainfall is ample, 25 inches being the annual average. The vegetation, like the climate, is more akin to that of mid-Europe than to that of the Mediterranean basin. The fauna includes the bear, lynx, and wild boar. The forests cover about one-third of the area, but are being rapidly cut down. The mineral resources are varied and of value, but there is little mining, owing to the lack of capital and facilities. Coal alone is mined to any important extent, and that in the northeast.

The population is almost entirely agricultural. About 70 per cent. of the total area is productive. There are about 4,500,000 acres under cultivation, nearly all tilled by the owners. There are few large farms. Modern processes in farming are slow of introduction. Cereals, with corn at the head, are the chief crops. Corn is the staple food

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of the people. Plums are an important crop and form, as prunes, a noteworthy item of export. Tobacco is raised in the south. Silk culture is making a good beginning. The best pastures are in the southwest. Cattle, sheep, and swine are raised extensively, oxen being used freely as work animals. In 1900 Servia had 956,661 cattle, 3,061,759 sheep, 959,580 hogs, and 184,849 horses.

The manufactures are of little importance, being chiefly native and household, and confined in the main to the production of war accoutrements, cotton goods, glass, and carpets. The only water communication is afforded by the Danube and the Save on the northern border. The main railroad line is the Belgrade, Nish and Vrania, which forms a part of the International Railway, and with its branch lines has a total mileage of 354. It is under Government control. The trade of Servia (exclusive of the transit trade) in 1901 amounted to $21,278,610, including exports to the value of $12,691,702, and imports, $8,586,908. Live stock and farm products are the leading exports.

The establishment of the National Bank of the Kingdom of Servia in 1883 marked the beginning of a new era in Servian banking. It is empowered to issue bank notes. In 1900 there were 5 smaller banking establishments. In 1875 the French standard of money, weights, and measures was adopted. The dinar, the unit of the monetary system, corresponds to the franc and equals 19½ cents in United States money. The public finances of Servia previous to the Treaty of Berlin, although not on a systematized basis, were nevertheless in a fairly good condition. As a result, however, of the cost of the wars of 1876-78 and the liabilities fastened upon the country by the Congress of Berlin and of Servia's participation in the construction of the International Railway, a large national debt was created, which in 1903 had risen to $81,500,000.

In 1882, four years after its complete independence was acknowledged by the Treaty of Berlin, the Principality of Servia became a constitutional monarchy. A new Constitution supplanting the former one of 1869 was promulgated by the National Assembly in 1889. The Executive Department is composed of the King and a Cabinet of eight Ministers, responsible to the nation. The National Assembly, or Skupshtina, consists of 262 Deputies, 64 appointed by the King and 198 elected members apportioned among the various provinces or departments on the basis of one member for each 4500 tax-paying male citizens. An additional member is allowed for each surplus-age of 3000. All male Servians 21 years of age paying a direct annual tax of about $3 are entitled to suffrage. There is also a State Council composed of 16 members, 8 appointed by the King, and 8 chosen by the Skupshtina, which supervises certain financial matters, hears claims against the Government, and examines proposed legislation. The Great National Assembly, which is convened to act upon special matters of great moment, consists of double the number of members of the ordinary Skupshtina, and is wholly an elective body. The judiciary is vested in a High Court of Appeal, a Court of Cassation, a Commercial Court, and 23 courts of the first instance. For purposes of local government Servia is divided into 17 provinces or departments. The capital and largest city is Belgrade (q.v.). The second city in size is Nish.

The population in 1901 was 2,493,770, almost all being Serbs, or Servians (of the Slav family), and Greek orthodox. There are 9 cities of over 8000. The cities, by striking contrast to the districts, are rapidly taking on the characteristics of modern European towns. There is no caste. All Christian religious faiths are tolerated. The national Church is governed by a synod of bishops. Education is free and on a rather promising footing, but the percentage of illiterates is large. The attendance is meant to be obligatory, but there is a lack of instructors. The State maintains the high schools, and pays part of the expense of the elemental schools, the municipalities paying the balance. At the head of the educational system is the scientific 'Great School' at Belgrade, with faculties of technical science, philosophy, and law. It is virtually a university.

HISTORY. The land occupied by modern Servia lay chiefly in the Roman province of Mœsia, and was peopled by Thracian or Illyrian tribes. It was overrun successively by Huns, Ostrogoths, and Lombards, and in the seventh century was seized by the Avars. About 637 the Serbs or Servians, a Slavic tribe, entering the country at the invitation of the Emperor Heraclius, to oppose the Avars, occupied it from the Save to the Balkans and from the Morava and the Adriatic. They were converted to Christianity about the middle of the ninth century, and for two centuries were engaged in constant warfare with the Bulgarians, Asiatic invaders on the north, who at that time terrorized the Greek Empire. In the eleventh century the Byzantine Imperial authorities, who had hitherto allowed the Servians to retain a practically autonomous patriarchal government under their Grand Shupans, or native chiefs, sought to put more restrictions upon them. The Servians threw off the Imperial authority, and their Grand Shupan Michael (c.1050-80) proclaimed himself King of Servia and was so recognized by Pope Gregory VII. The hard struggle for independence ensued, occupying nearly three generations. In 1165 Stephen Nemanya (or Nemanja) founded a dynasty which lasted nearly two centuries. Under this dynasty the territory of Servia gradually expanded, and its power increased, reaching its height under Stephen Dushan (1331-55), when the Servian Empire, as it proudly called itself, embraced Bosnia, Albania, Macedonia, Thessaly, part of Bulgaria, and all of the Hellenic peninsula except Attica and the Peloponnesus. The Byzantine Emperor sought the alliance of the Servian monarch, who was a statesman as well as a general. But Dushan died before he was able to organize and consolidate his territories, and the advance of the Turks broke up the short-lived empire he had created. The dynasty of Nemanja closed with Dushan's son, who died about 1371. The tide of Turkish invasion was now sweeping over the Balkan Peninsula, and the battle of Kossovo in 1389 placed Servia at the mercy of the Ottomans. A small body of survivors of the Servian forces found refuge in the mountainous region since known as Montenegro (Crnagora). Servia passed under Turkish rule, its subjugation being completed by Sultan Mohammed in 1459. It was the scene of devastating warfare between Hun-

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gary and the Turks. In 1456 Belgrade, which had been occupied by the Hungarians, was successfully defended against the Turks by the heroic John Hunyady and a crusading force, but in 1521 Sultan Solyman the Magnificent made himself master of the city. In 1718 Belgrade and part of Servia were ceded to Austria, but were retroceded in 1739. Under the rule of the Turks Servia suffered fearful oppression. The native nobility became extinct and the Servians were reduced to a race of peasants. In 1804 the people rose under Czerny George (q.v.), or Kara George. Assisted by Russia, the Servian leader was able to win for his people a partial autonomy. The Napoleonic wars, however, compelled Russia to withdraw her assistance, and Servia was resubjected to the Ottoman yoke in 1813.

In 1815 Milosh Obrenovitch (q.v.), who had served under Kara George, suddenly headed another revolt, which proved successful, and in 1817 he was elected by the chiefs and the clergy Prince of Servia. After the disastrous war with Russia in 1828-29 Turkey granted autonomy to Servia and recognized Milosh as hereditary Prince (1830). Turkey, however, retained the right of keeping garrisons in the country. Milosh abdicated in 1839 because Russia and Turkey insisted upon a constitution which practically put the powers of government into the hands of a Senate. He was succeeded by his son Milan, who reigned but a few weeks, and was succeeded by his brother Michael. A strong party opposed to the Obrenovitch dynasty deposed Michael in 1842 and made Alexander, son of Kara George, Prince. Alexander Karageorgevitch was wholly under the influence of Austria and the Porte, and was deposed in 1858. The aged Milosh was recalled, and in 1860 died, being again succeeded by Michael, who developed the idea of uniting in one nation all the Serbs, who are the main body of the population in Bosnia, Herzegovina, and Montenegro, as well as Servia. He secured the withdrawal of all Turkish garrisons from Servia in 1867, and was on the point of accomplishing even more in the direction of nationalization and independence when he was assassinated by adherents of the rival house in 1868. As Michael had no direct heir, the Skupshtina or Senate proclaimed his nephew, Prince Milan, who attained his majority in 1872. Under the guidance of the Prime Minister Ristić (q.v.) Servia obtained a constitutional organization, with a Council of State, and the Skupshtina was transformed into a Chamber of Deputies, elected by proportional representation. In July, 1876, Servia declared war against Turkey, being joined by Montenegro. The Servians, generally unsuccessful, notwithstanding the help of numerous Russian volunteers, were totally defeated at Diunis and Alexinatz in October. An armistice followed, and a treaty of peace was signed March 1, 1877. In April Russia declared war against Turkey (see RUSSO-TURKISH WAR), but Servia did not venture to take the field until the fall of Plevna had virtually decided the war. The complete independence of Servia was established by the Treaty of Berlin (see BERLIN, CONGRESS OF), which also gave the country an increase of territory. In 1882 the principality was proclaimed a kingdom. In 1885 war was declared against Bulgaria, but the Servian army, though larger and better equipped than that of the enemy, was defeated by the military genius of Prince Alexander of Bulgaria (q.v.), and Servia was invaded. Peace was secured through the intervention of the Great Powers. King Milan, who had sought to strengthen his position by promulgating a liberal constitution, January, 1889, dissatisfied with the democratic course of the radicals, abdicated March 6, 1889, in favor of his son Alexander I. (q.v.), who dispensed with a regency in 1893.

Alexander began at once to act the autocrat. In 1894 he recalled his father to assist him against his radical ministers, and by proclamation restored their full privileges to his father and mother, Natalie. On May 21st he abolished the liberal Constitution of 1889, restoring that of 1869. In 1900 he married Draga Mashin, in defiance of his father's wishes. The new Queen was many years his senior, and had been dismissed from the service of Queen Natalie because of her intrigues. Milan was once more exiled, and Alexander began a period of high-handed personal rule which aroused intense hostility among the most influential persons in the kingdom. The attempt of Queen Draga to impose upon the people the belief that an heir to the throne was in prospect increased the popular dislike. In April, 1903, King Alexander abrogated the Constitution, changed the Ministry and the laws, and then restored the mutilated Constitution to operation. This was a process attended with some peril in a country where liberalism and even republicanism had been growing. A conspiracy was formed by leading officers of the army, and on June 11th the palace was entered and the King, the Queen, two of her brothers, and two of the Cabinet, Premier Markovitch and Minister of War Pavlovitch, were assassinated. So far as any external evidence was given, the King and Queen had hardly a friend in Servia. The people received the revolution with approval or stolid indifference. A provisional government of liberals was formed and the family of Karageorgevitch, the rivals of the House of Obrenovitch, was restored in the person of Prince Peter, then living in exile in Geneva. See PETER I. KARAGEORGEVITCH.

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SERVIAN LANGUAGE. See SERBO-CROATIAN LANGUAGE.

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SERVIAN LITERATURE. I. ANCIENT PERIOD TO THE END OF THE FOURTEENTH CENTURY. The earliest literature was in Old Church Slavic and consisted of ecclesiastical books. The earliest extant monuments belong to the twelfth century. Besides the books necessary for the liturgy others were translated or compiled from Greek originals. A greater claim to the title of literary productions belongs to the lives of the saints of the Servian Church and prominent Servian rulers and personages. Among the numerous political, diplomatic, and judicial monuments of the period, the so-called *Vinodolian Law* and the Code of King Dushan are remarkable for the purity of the language employed and the flood of light they shed on many points connected with the history and civilization of Servia.

II. MIDDLE OR DALMATIAN PERIOD. (Fifteenth to seventeenth century, inclusive.) The half Slavic, half Italian, commonwealth of Ragusa or Dubrovnik, in Dalmatia, produced a number of eminent writers. Among them Gundulitch (1588-1638) (q.v.) with his heroic epic *Osman*, Diokovitch (1563-1631), and the dramatist Palmotitch (1606-57), author of a *Christiad*, deserve special mention. The lyric poet Katchitch-Miotchitch (1690-1760) with his *Discourse* is the connecting link between the old Dalmatian and the modern Servian literature.

III. MODERN SERVIAN PERIOD. (Eighteenth century.) The contact with Western Europe at the end of the seventeenth and the beginning of the eighteenth century resulted linguistically in a mixture of Servian, Old Slavic, and Russian forms. The names most prominent during the eighteenth century are those of Yovan Rayitch (1726-1801), who wrote a *History of the Slavic Peoples, especially the Bulgarians, Croatians, and Servians* (1768, last ed., 4 vols., Buda, 1823), and Obradovitch (1739-1811), the pioneer of modern Servian. The latter went back to the native popular tongue in his writings: *Life and Adventures; Counsels of Common Sense,* a course of practical ethics; and the *Collection of Various Moral Trifles* (Vienna, 1793). Though still laden with Russian and other non-Servian expressions, his style is quite flexible, often graceful, and exhibits a preponderance of purely Servian words.

IV. NINETEENTH CENTURY. The first half of the nineteenth century was marked by the literary labors of the great Karajitch (1787-1864) (q.v.), the "father of modern Servian." He employed the pure Servian of the common people (of the south Shtokavian dialect) with such art, force, and purity that it was finally accepted as the standard. The sentimental novels of Milovan Vidakovitch (1780-1841), the pseudoclassical odes of Mushitski (1777-1837), and the epics of Milutinovitch (1791-1848) gave way to the more national, realistic, and life-like writers of the stripe of Branko Raditchevitch (1824-53). Of his poems the best are *The Pupil's Parting* and *The Path.* Another distinguished poet is the last *vladika* of Montenegro, Peter II., Petrovitch Nyegosh (1813-51), whose most important work is the *Mountain Crown,* a poem in dramatic form, relating the slaughter of the Mohammedanized Montenegrins by their Christian brethren, about the end of the eighteenth century. Zmaj Yovan Yovanovitch (see JOVANOVIĆ), born in 1833, is the greatest Servian poet living, Dyuro Yakshitch and Lazar Kostitch sharing with him the field of poetry. Among the novelists, Milan Militchevitch (q.v.) with his *Winter Evenings* holds the foremost place. Prince Nicholas of Montenegro, a poet of genuine inspiration and strength, is the author of the national (Montenegrin) hymn *Thither! Thither!* In Croatia, whose literary language is the same as that of Servia (the written characters, however, being different), the reforms of Karajitch found an enthusiastic supporter in the poet-publicist Ljudevit Gaj (1809-72). Of the other Croatian writers, by far the greatest is Ivan Mažuranić (1814-90) (q.v.), chiefly known as an epic poet. The lyric poet Preradovitch (1818-72) and Bogovitch (1816-93), the author of dramas and epics, also deserve mention. The scientific literature in Servian is of considerable extent.

The oral (popular) literature falls into two main divisions, with regard to subject matter: (a) the so-called *yunak* (brave, hero) songs, epic in character, relating the achievements of the national heroes; (b) the *feminine*, lyric in nature, dealing with the softer sides of the nation's life, chiefly, but not exclusively, with the lot of woman. In the epic (*yunak*) songs the four chief periods of Servian history are easily discernible: those composed in the earliest period, exhibiting the earlier strata of mythology overrun by and intermingled with later Christian elements; those narrating the glorious period of the Nemanya dynasty (from the twelfth to the fourteenth century); the songs depicting the loss of Servia's independence at Kossovo (1389) and subsequent events; the songs of modern times of the struggle for independence at the outset of the nineteenth century, including commemorations of the great leader Kara or Black George, and the Montenegrin uprisings, etc. This form of literary production is still going on.

Consult: Kapper, *Volkslieder der Serben* (Leipzig, 1852); Talvj, *Volkslieder der Serben* (2d ed., ib., 1853); id., *Historical View of the Languages and Literature of the Slavic Nations* (New York, 1850); Miklosich, *Beiträge zur Kenntnis der slawischen Volkspoesie* (Vienna, 1870); Krauss, *Sagen und Märchen der Südslawen* (Leipzig, 1883-84); Manoilovitch, *Serbokroatische Dichtungen* (3d ed., Vienna, 1888); Šafařik, *Geschichte der südslawischen Literatur* (Prague, 1865).

SERVIAN POLITICAL PARTIES. See POLITICAL PARTIES, section *Balkan States.*

SERVIAN WALL (Lat. *agger Servii Tullii*). The first inclosing wall of ancient Rome, the construction of which is assigned to Servius Tullius. The wall was constructed against one of the cliffs forming the face of the Capitoline, Quirinal, Oppian, Cœlian, and Aventine Hills, crossing the narrowest parts of the valleys between, and reinforced at its weakest points by an agger consisting of an embankment with an outer wall and ditch. The whole course of the Servian wall and the position of the gates have been definitely ascertained by excavations made since 1860.

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